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CHEMICAL PROCESSING

incorporating PROCESS DYNAMICS

APRIL 1961

Japan CPI Losing Labor-Cost Edge

Leaders bank on efficiency, quality, automatic controls for growth . . . 25

Mist Eliminator Saves $3000/yr.

Traps 1000 lb/day of H_2SO_4; stops air pollution; ends roof corrosion . . . 60

New tool for the operating manager . . .

VALUE ENGINEERING

Finds 'best buy' in equipment . . . has saved $1 million in three years for Du Pont . . . page 28

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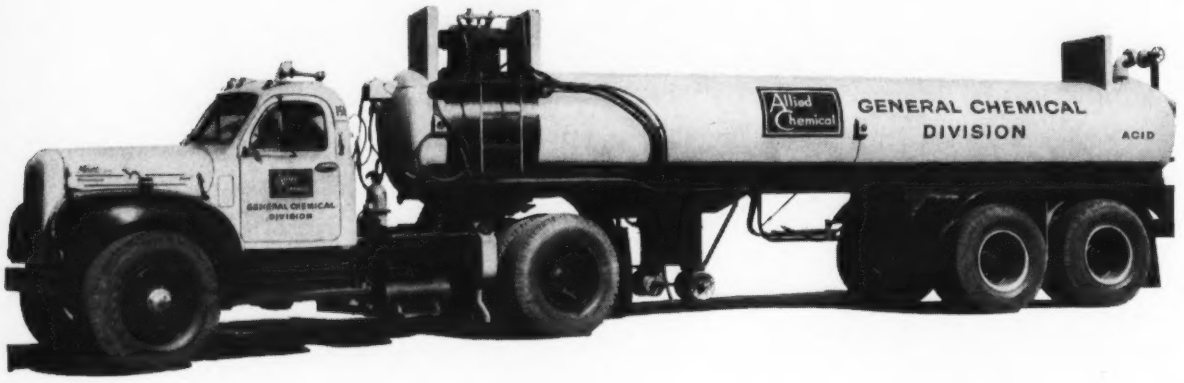
"Executive Magazines for Industry"

Now... HF by Tank-Transport Delivery



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Check 3222 opposite last page.

conventions and exhibits

Apr. 10-13. 30th National Packaging Exposition, American Management Association, McCormick Place, Chicago, Ill.

Apr. 17-19. 7th National ISA Symposium on "Instrumental Methods of Analysis," Shamrock-Hilton Hotel, Houston, Texas.

Apr. 18-20. 5th Annual Industrial Mutual Aid and Disaster Control Seminar, Shamrock-Hilton Hotel, Houston, Texas.

Apr. 27-28. Fiber Society, Spring Meeting, Georgia Center for Continuing Education, Athens, Ga.

Apr. 30-*May* 3. Pharmaceutical Manufacturers Association, Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

Apr. 30-*May* 4. Electrochemical Society, Claypool Hotel, Indianapolis, Ind.

May 1-3. 34th Annual Meeting, American Oil Chemists' Society, Sheraton-Jefferson Hotel, St. Louis, Mo.

May 8-10. Instrument Society of America, 4th National Power Instrumentation symposium, LaSalle Hotel, Chicago, Ill.

May 9-11. The Material Handling Institute, Inc., Eastern States Show, Philadephia Trade and Convention Center, Philadelphia, Pa.

May 10-12. ISA Pulp and Paper Instrumentation Symposium, Northland Hotel, Green Bay, Wis.

May 15-17. Chemical Specialties Manufacturers Association, Midyear Meeting, Drake Hotel, Chicago, Ill.

May 17-18. Chemical Market Research Association, Plaza Hotel, New York City.

May 21-23. Fluid Controls Institute, Inc., Meeting, The Cloister, Sea Island, Ga.

. . . Meetings and shows of interest to the chemical industries

May 22-24. Synthetic Organic Chemical Manufacturers Association, Spring Outing, Skytop Lodge, Skytop, Pa.

May 22-25. The Design Engineering Show and Conference, Cobo Hall, Detroit, Mich.

May 24-25. Commercial Chemical Development Association, Meeting, Bedford Springs Hotel, Bedford Springs, Pa.

June 5-9. 9th National Plastics Exposition, Coliseum, New York, and the SPI National Plastics Conference, Commodore Hotel, New York City.

June 8-10. Manufacturing Chemists' Association, Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 11-15. 54th Annual Air Pollution Control Association Meeting, Hotel Commodore, New York City.

June 13-16. 3rd International Symposium on Gas Chromatography, Instrument Society of America, Kellogg Center for Continuing Education, Michigan State University, East Lansing, Mich.

June 28-30. 2nd Joint Automatic Control Conference, University of Colorado campus, Boulder, Colo.

July 18-20. Western Plant Maintenance & Engineering Show, Pan Pacific Auditorium, Los Angeles, Calif.

Aug. 6-12. International Congress on Pure & Applied Chemistry, Montreal, Canada.

Sept. 5-8. National Chemical Exposition, International Amphitheatre, Chicago, Ill.

Nov. 27-*Dec.* 1. 28th Exposition of Chemical Industries, New York Coliseum, New York City.

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TX-1 and TS-254 have made the grade from laboratory to plant production. They are oxazoline waxes—an entirely new product series from CSC's Nitroparaffins. Since they are synthetic, availability and consistency of quality present no problems.

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There are four other oxazoline waxes also available. Let us discuss your specific problem and provide you with samples. Write on your letterhead to Market Development Department, Commercial Solvents Corporation, 260 Madison Avenue, New York 16, New York.

PHYSICAL PROPERTIES	TS-254	TX-1	ES-254	TS-254A	TS-254AA	TS-970
Melting point °C	63	160	37	50	93	74
Volume Expansion on melting—%	7.7	—	8.9	9.2	9.2	9.1
Penetration, ms/100 gm. load (ASTM D5-25)	0.2	—	1.3	0.3	0.4	0.1
Acid No. (approx.)	7	12	9	2	1-2	6
Solubility, % by wt. in:						
Butanol	7	49	50	22	13	4
Toluene	16	52	49	16	7	16
Carbon Tetrachloride	16	47	49	gel	14	gel
Stoddard Solvent	12	52	49	17	4	5
Butyl Acetate	11	55	49	13	9	6
Methyl Isobutyl Ketone	10	ins.	49	10	8	5
Turpentine	21	10	24	21	10	10

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Check 3223 opposite last page.

CHEMICAL PROCESSING

HIGHLIGHTS

APRIL 1961

VOLUME 24 • NUMBER 4

THIS MONTH'S COVER

A meeting of the value engineering group at Du Pont, appraising comparable equipment to determine which is the "best buy," is depicted on this month's cover. Each specialist in group analyzes individual items with respect to a specific property, such as performance or maintenance. By considering cost along with quality, a recommended best value is obtained. Program has saved Du Pont more than a million dollars during the past three years. See page 28.

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Leaders expect labor-cost advantage to vanish; bank on efficiency, quality to grow

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Central group compares competing low-cost items used in quantity, recommends 'best buy'

31 Does it really cost less to build overseas?
Low wages may make it seem so, but lower productivity and fringe benefits muddy picture

36 Industry tackles detergent-waste puzzle
Substitute surfactants being groomed, but costs big barrier; new sewage treatments under study

60 Mist eliminator saves $3000 in year
Redeems self in 14 months by trapping 1000 lb/day of H_2SO_4; nips pollution and corrosion

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Instrument uses electrolytic principle to give readings within 10% of analytical titrations

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126 Couplings cut off spillage of pellets; save $100/wk
136 Here's way to gently pump shear-sensitive paints
140 Fire-tube shift boosts boiler efficiency

Sooner than you think

The next building wave in applied chemical technology may take place sooner than you think.

Increasingly, the need is for replacement of facilities that are clearly outmoded, obsolete, unable to be maintained so as to turn out product competitive with the most modern plants in various places of the world. "Efficiency" is a word being heard more often among leaders of the chemical industry, echoing as it is from Europe and Japan, where much energy is being coupled with modern facilities to gain, for very determined people, competitive acceptance of lower cost but quality products.

If such new building is to be gotten under way, where is the money to come from? Some talk is of Government tax incentives in the form of increased depreciation deductions for specified forms of manufacturing facility investment deemed to be stimulative to the industry's growth rate and to provide the kind of growth best suited to the national needs.

Whether the direct project incentive plan — which tends to appeal to the politically-minded as they can directly visualize as well as control results — wins out or whether the more conventional depreciation-type relief — which leaves the decision as to how to use the money up to industry — wins out will be anyone's guess until the matter is settled within the Administration and probably Congress.

But, one way or another, chances are good that there will be more money for expansion in the coffers and it will be good for the equipment and engineering-construction business at first, then good for the chemical business in the domestic as well as world markets after the plants get running.

John B. Mellecker
Editor-New York

if pollution is your problem . . .

Chemico venturi gas scrubbers have proved highly successful in solving air pollution problems in a wide variety of industrial applications. More than 400 venturi units have already been installed to clean up dust, fume and mist problems in the iron and steel, chemical, petroleum, metals, minerals, fertilizer and paper industries. Chemico's venturi scrubbers combine simplicity of design with very high efficiency—up to 99.95% in some applications.

Chemico Bulletin M104, illustrated here, gives a complete description of how venturi scrubbers operate and where they are now in use. Address your request for this brochure to Department GSR at the address below.

CHEMICO
CHEMICAL CONSTRUCTION CORPORATION
320 Park Avenue, New York 22, New York

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THERMAL FIRED HEAT EXCHANGERS

Large capacities factory built as readily as small sized units.

Shown is the two pass construction of a THERMAL fired heat exchanger capable of heat duties of over 15,000,000 BTU/hr. Coiling of outer pass absorbs differential expansion within the heater. Unit shown is constructed of all Inconel but construction using stainless or carbon steel is readily available. Fuel will be natural gas although burner system, located at top of heater, is not shown in these photographs. THERMAL Heat Exchangers may be operated on oil or gas to produce temperatures to 1900 F, flows to 500 lbs/sec, and pressures to 5000 psig.

Write for Bulletin #113 for full description of THERMAL fired heat exchangers.

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CHEMICAL PROCESSING

APRIL 1961
VOLUME 24 • NUMBER 4

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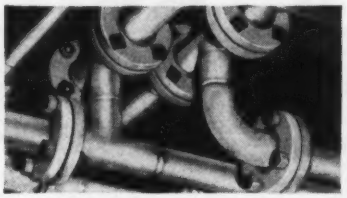

The ultimate installed cost of corrosion-resistant process lines *can* be substantially reduced . . . where pipe line design specifications take full advantage of up-to-date developments in improved fittings design and new piping standards.

The most recent issue of the Code for Pressure Piping, ASA B31.3-1959, allows use of *light wall* Stainless Steel Schedules 5 and 10 pipe and fittings for critical process lines to a degree not possible with *outdated* specifications. The broader scope of pressure-temperature operating conditions included in this new code, permits computations utilizing these more economical wall thicknesses. This, plus a specification recognizing the efficiency of Speedline fittings, guarantees a soundly designed system at a *lower* installed cost.

Every Speedline fitting has built-in advantages that contribute to lower installation cost because they are designed especially for use with light wall Schedules 5 and 10 pipe. Speedline's extra length feature means butt joints are easier to align and easier to weld because you're always connecting "straight to straight". There's ample clearance to attach flanges to any or all ends of a Speedline fitting without fouling—by expanding or welding. Speedline aligning connectors assure sound socket-joining for both pipe and fittings. With Speedline—*one fitting* does it all. Review your process piping specifications to be sure they call for all of the cost savings possible with light wall pipe and modern Speedline fittings.

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STAINLESS STEEL • ALUMINUM • SPECIAL ALLOYS

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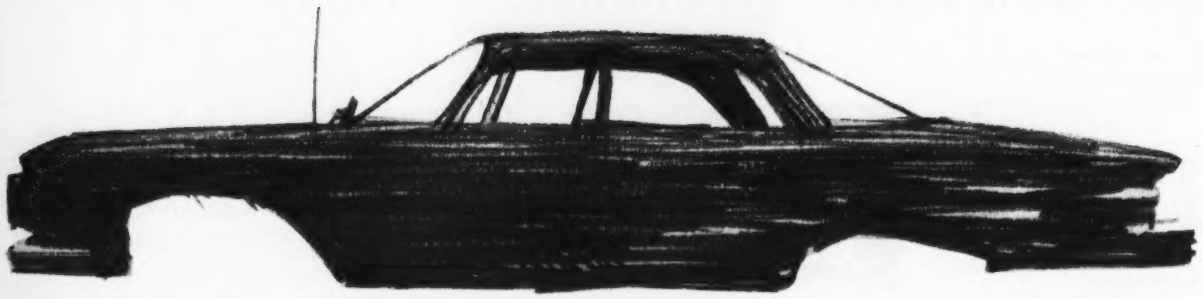

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VANCORAM AMMONIUM METAVANADATE IS JUST AS ESSENTIAL FOR BEST RESULTS in a variety of important catalytic processes. These include inorganic and a wide range of organic oxidation reactions. Vanadium catalysts are now chosen almost exclusively in the manufacture of SULFURIC ACID, also of PHTHALIC ANHYDRIDE, the well-known basic material for the production of alkyd, vinyl and nitrocellulose plastics. In these and other applications, Vanadium compounds enjoy an enviable reputation for quality, efficiency and economy in process. Vanadium Corporation of America welcomes inquiries on Ammonium Metavanadate and other Vanadium compounds, including Vanadium Pentoxide, Sodium Metavanadate, Sodium Orthovanadate, Vanadium Chloride and Vanadyl Sulfate. For further information, call your VCA representative, or write Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N.Y.

VANCORAM CHEMICALS

Check 3227 opposite last page.

National expects linear polyethylene to be short by '63; plans plant

Counting on linear polyethylene being in short supply by early 1963, **National Distillers and Chemical Corporation** will build 60-million-lb/yr linear-polyethylene plant at Houston, Texas. National's division, U.S. Industrial Chemicals Company, will operate plant which will mark entry into linear-polyethylene manufacture when completed late in 1962. National now has facilities for conventional polyethylene with rated capacity of 300 million lb/yr. U.S.I. currently is making linear polyethylene resin available from pilot plant facilities and through resale arrangement.

Scheduled for completion early next year is 30% expansion of capacity of **Monsanto Chemical Company** Plastics Division's high-pressure polyethylene plant at Texas City, Texas. Technological refinements incorporated in new facilities, will permit manufacture of larger quantities of newcomer polyethylene resins of which Monsanto has introduced eight during 1960.

Celanese Chemical Company which has just completed a multi-million dollar expansion that almost doubles capacity for production of acrylate esters at Pampa, Tex., will build multi-million-dollar plant on 1000-acre site near Bay City, Texas, for manufacture of acetyls. A European process which provides different route for economical manufacture of acetyls has been licensed by Celanese.

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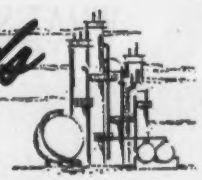


Survey indicates need to improve recruiting 'follow-through'

Why is it often so difficult for would-be-employer and job-seeker to get together? Ads which over-glamorize company opportunities and employer response that more resembles an obstacle course than enlightened interest in trying to hire, says Equity Advertising Agency, Inc. of New York City. Equity made a survey using a dummy resume in response to several dozen recruiting ads. Results were startling, in that they were often coldly impersonal (one return was a post card) and only vaguely informative.

Research was for a multi-client group which was — according to Equity — quick to agree that something is wrong with recruiting communications.

An Equity spokesman has these recommendations for improving the situation:

• Try to formulate a realistic definition of the qualities desired in the man to be hired — and be willing, if at all possible, to take an otherwise qualified person and train and orient him to the specific role desired.

• Make your ads more specific and down to earth.

• Have your most highly skilled personnel people handle initial contacts with most likely respondents — first impressions are vital!

Equity explained that, although the survey applied specifically to electronics and physics categories, there is little doubt but what findings can be applied to chemical and other fields. ■

Ag chemicals finding 'product-mix' must fit users conditions

Soil testing by Government and independent labs has become important in helping the fertilizer-chemicals industry make sales which farmer-customers know will give soils exactly what's needed for maximum productivity. This new way of selling product formulations "tailored" to needs is reported to be paying off. United States Testing Company — a private lab — says their volume of soil-test business has nearly tripled in the past three years.

Overseas, U.S. ag-chemicals firms should coordinate interests with ag agencies in the foreign countries' governments, make direct contacts with farmers, supply products of highest quality, and determine that "they, as well as we, make a profit" warns Hercules Powder Company's ag chemicals division manager, P. J. Reno. ■

Textiles — Montecatini is reported to have process for dyeing polypropylene cloth, which industry sources rate as feat if true.

Timely Clothes, Inc. is chemically treating wool to increase "stretch" . . . product to appear in fall suits . . . inventor claims this may make synthetics "obsolete" for men's wear.

General Aniline & Film may have breakthrough in Wash & Wear treatment of cotton — non-polymerizing crosslinking agent is used, said to be of molecular dimensions increasing probability of penetration into cellulose fiber structure to reach -OH sites.

Plastics — Eastman's entry into polypropylene commercially introduces a product said to have the "lowest ash or residue of any polypropylene on the market" — a factor which permits use of higher concentrations of anti-oxidants and UV inhibitors without affecting other properties, notably brightness of color. To achieve this low residue, Eastman would have had to achieve a better production method for removal of catalyst traces, these being the source of normal "ash" content.

Solvent extraction, filtration, and other operations are conventionally used for catalyst removal. One of CP's contacts has suggested the possibility that a breakthrough may have been made in volatilizing or distilling-out the trace material.

Celanese "Celcon" joins Du Pont's "Delrin" in a drive for the polyformaldehyde market — recently spurred by Delrin's price drop to 65¢.

Equipment — A trade association of engineered equipment manufacturers has come into being, is currently undergoing expansion of membership. Called "Process Equipment Manufacturers' Association," group will be subject of article in next month's CP.

Advocating Government guarantee of funds mobilized by private banks to finance U.S. products sold on credit abroad, David Rockefeller, president of Chase Manhattan Bank, echoes a plea heard increasingly from those who make our process-equipment overseas marketing competitive with that from other countries. Rockefeller estimates as much as $1-billion a year would be necessary to finance enterprises that would be opened.

Formation of **Packaging & Labeling Department** at Stauffer Chemical seen as recognition of function's growing importance. . . .**Merger in nuclear field** brings together Olin Mathieson, Nuclear Development Corp. and Mallinckrodt, results in broader service possibilities, with emphasis on fuels & their uses. . . .Look for others. . . .Socony-Mobil allocates $700,000 in **education grants**. . . .**German Chemical industry** faces tightening up of fast write-offs, other concessions as postwar building boom dwindles. . . .West German chemical **sales up 13.5%** in 1960 — no indication of profits, however. . . .U.S. has **tripled investment** in European chemical plants since 1959, already spent more than in Canada and Latin America. . . .**Soviet seen lagging** in key basic chemical facilities even though getting 50 plants, chiefly from West Europe.

WHAT'S NEWS IN ENJAY TECHNICAL SERVICE

Enjay helps reduce cost of 90°C vinyl wire insulation...

An important part of Enjay Technical Service is developing useful new products that reduce costs, yet maintain performance. Ditridecyl phthalate for use in plasticizing vinyl wire insulation is a good example of this research activity. By tests, such as the oven aging shown above, Enjay was able to prove that DTDP, made from Enjay tridecyl alcohol, performs as an efficient, non-volatile plasticizer for 90°C wire — yet reduces plasticizer cost.

Test results, at right, show that the insulation exceeds the U.L. Specifications.

Enjay research facilities and technical skills are available to customers in the vinyl wire, film and sheeting industries.

If you would like to receive a free copy of our new Technical Bulletin No. 20 on Enjay oxo alcohol for plasticizers, write to 15 West 51st Street, New York 19, N. Y.

TEST RESULTS: 7 DAYS @ 121°C

	U.L. Specification Minimum	DTDP Plasticizer
Elongation	65% retention	100% retention
Tensile Strength	65% retention	101% retention
Dielectric Strength	50% retention	127% retention
Insulation Resistance*	.01 megohm based on 1000 ft.	0.36 megohm based on 1000 ft.

* 1 day and 7 days @ 113°C.

ENJAY
PETROCHEMICALS

EXCITING NEW PRODUCTS THROUGH PETRO-CHEMISTRY

ENJAY CHEMICAL COMPANY

A DIVISION OF HUMBLE OIL & REFINING COMPANY

Check 3228 opposite last page.

OUR GROWING INDUSTRY

From page 8

Process involves combination of oxygen with ethylene gas in presence of catalysts. Principal product to be made at Bay City will be acetaldehyde, starting point for many other acetyl chemicals.

Celanese's facilities at Pampa are designed for annual output of 14 million lb of butel and 2-ethylhexyl acrylate and glacial acrylic acid.

Medium- and high-density polyethylene and ethylene copolymers as well as polypropylene will be produced by a second polyolefin plant to be built by **Dow Chemical Company** at Plaquemine, La. Dow started up its first plant there in November. Second plant will utilize improved Ziegler-type linear-polyethylene process developed by Dow. It is scheduled for completion in second quarter of 1962.

Enjay Chemical Company, division of Humble Oil & Refining Company, will boost ethylene capacity of Bayway, N.J., refinery to 175-million-lb/yr when 35% expansion is completed early next year.

The Borden Company is seeking to buy **Columbus Coated Fabrics Corporation**, Columbus, Ohio, an $18-million manufacturer of such products as oil-coated, nitrocellulose-coated, polyvinylchloride-coated and acrylic-coated fabrics. Columbus firm would operate as division of Borden Chemical Company.

The Glidden Company has purchased assets of **Crane Co.'s** Powdered Metals Division at Johnstown, Pa. This enables Glidden to enter structural ferrous metal powder field. Crane Company realized approximately $1 million on transaction.

Stockholders of **National Distillers and Chemical Corporation** and **Bridgeport Brass Company** will vote on merger of two enterprises at meetings to be held in May. Under merger terms, National would exchange 1.35 shares of its common stock for each share

of Bridgeport common.

Both companies have been working together through Reactive Metals, Inc., a 60%-owned National subsidiary under management supervision of Bridgeport. (Remaining 40% is held by Sharon Steel Corporation). Bridgeport would become division of National under its present management. Austin R. Zender, Bridgeport president, would become director of National and chairman of its executive committee.

Justice Department indecision is blamed for cancelling of plans to combine **Minnesota Mining & Manufacturing Company** and **Warner-Lambert Pharmaceutical Company.** Officials of the two companies had asked the Department of Justice for clearance before taking final action.

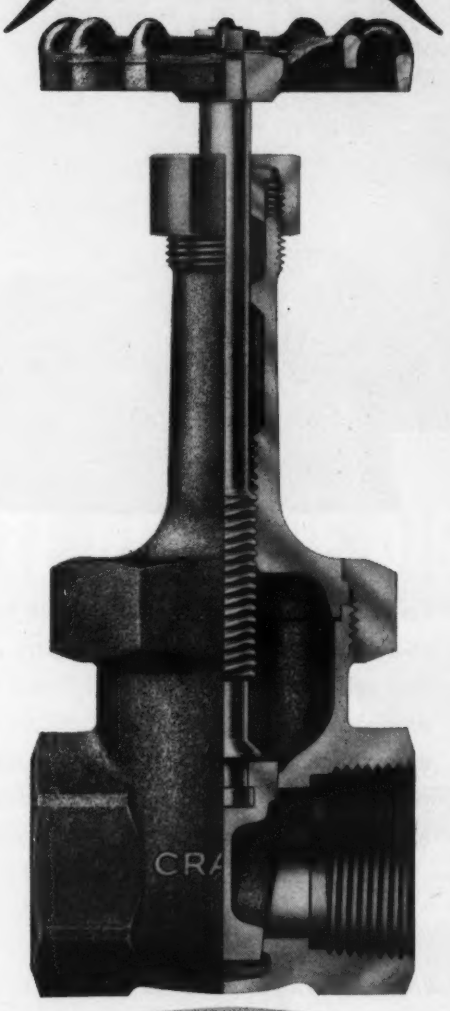
Dixon Chemical and Research, Inc., sulphuric acid producer, is entering field of specialty coatings, sealing compounds and chromic acid by purchasing **Better Finishes and Coatings Company** and two subsidiaries for $750,000 in cash and stock.

Merger of **Atlas Powder Company** and **The Stuart Company,** ethical pharmaceutical manufacturer, will be voted upon by shareholders of both companies on April 25. Under proposed merger, Stuart would operate as The Stuart Division of Atlas. Deal involves a four-for-one split of Atlas common stock. Three principle Stuart share owners have agreed to accept one share of a new Atlas Class A stock for each five shares of Stuart held.

Tenneco Chemical Company, newly formed by **Tennessee Gas Transmission Company,** will build and operate a petrochemical complex, announced earlier this year on the Houston Ship Channel. Complex will have initial capacity of 100-million-lb/yr acetylene. A second unit will convert most of acetylene into vinyl chloride monomer at 200-million-lb/yr rate. Construction is to begin by June

ANOTHER ACHIEVEMENT IN MODERN FLOW CONTROL BY CRANE

NO WASP WAIST ON THIS VALVE



CRANE 125-AND 150-POUND UNION BONNET BRONZE GATE VALVES

STRONGER CYLINDRICAL BODY DESIGN FOR LONG SERVICE LIFE

Every part of these new valves has been carefully engineered and liberally proportioned to assure an extra safety factor over the recommended working pressures. Unlike ordinary pinched-in, rectangular body valves, Crane's cylindrical body—the same design used in Crane's heavy-duty 200- and 300-pound bronze gate valves—distributes pressure loads uniformly and reinforces seat against the wedging action of the disc.

Wider, huskier hex ends combined with the new body shape give this valve greater rigidity, reduce chance of leakage and early failure resulting from piping strains. They make for easy installation, too.

Many other Crane features—the deep stuffing box that can be repacked under pressure, substantial thread engagement between stem and bonnet, and a precisely fitted bonnet joint—make this valve a best buy for safe, dependable, long service on steam, oil, gas and water lines.

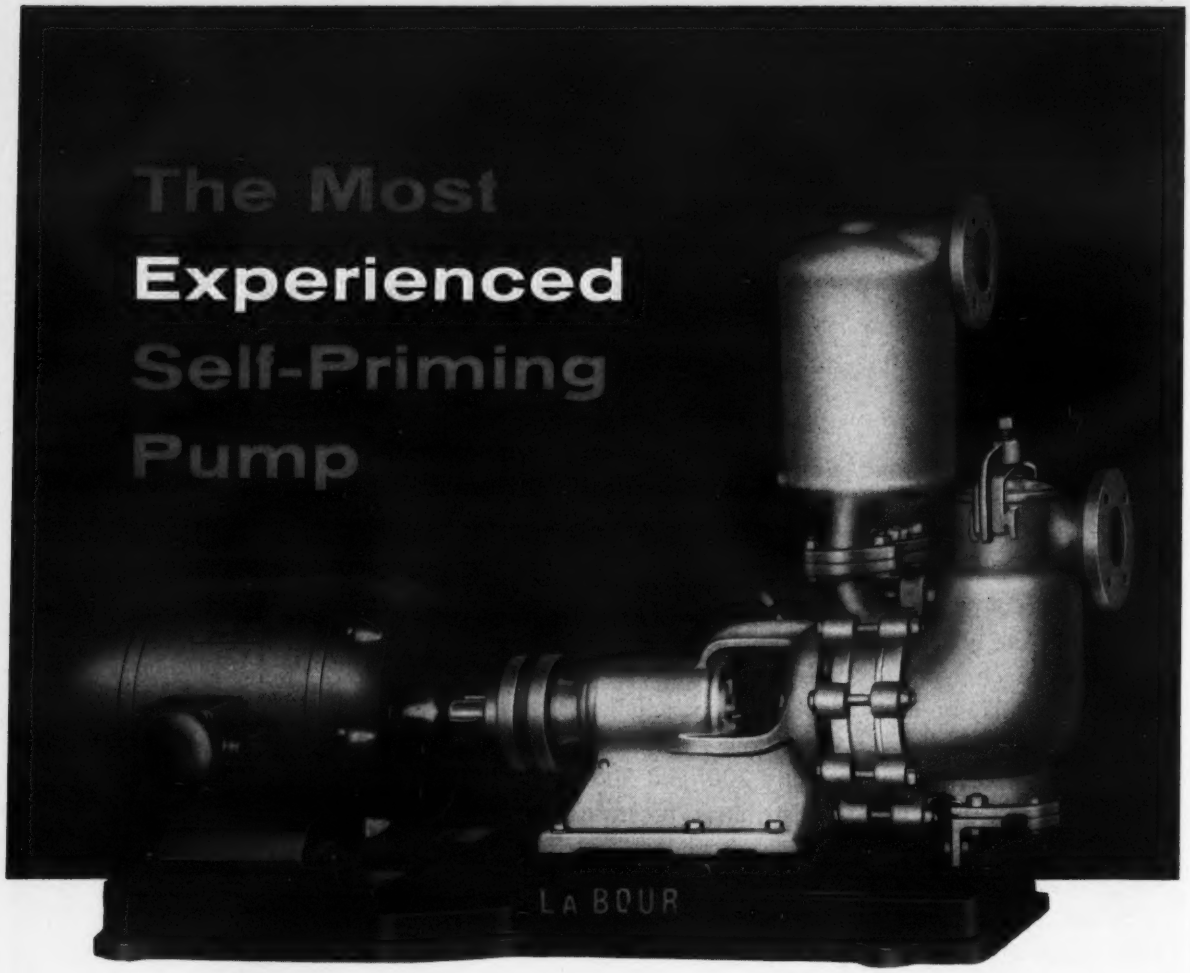
Crane's 125- and 150-pound Union Bonnet Bronze Gate Valves are made in ¼-inch to 2-inch sizes with either a solid or split wedge disc. Both disc types are carefully machined and fully guided for positive, easy operation.

Your Crane Distributor has these new valves in stock. Contact him for information or write Crane Co., Industrial Products Group, 4100 S. Kedzie Avenue, Chicago 32, Ill. In Canada, Crane, Ltd., 1170 Beaver Hall Square, Montreal.

CRANE

VALVES • PIPING • ELECTRONIC CONTROLS
PLUMBING • HEATING • AIR CONDITIONING

Check 3229 opposite last page.



LaBour Type DPL as pictured here is the modern, improved counterpart of the first self-priming pump ever offered to the chemical industry. Nearly 40 years of experience in hundreds of plants all over the world have proved the reliability and efficiency of this unit to the satisfaction of a whole generation of engineers and operating men.

If you're looking for assured performance and dependable, trouble-free economy, you can play safe by specifying LaBour for your toughest jobs as well as for routine applications. Ask us for details.

ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

LABOUR

THE LaBOUR COMPANY, INC. • ELKHART, INDIANA
WHITE PIGEON, MICH. • LONDON, ENGLAND

Check 3230 opposite last page.

OUR GROWING INDUSTRY

1. **Joe J. King,** former senior vice president of Tennessee Gas, is president of Tenneco Chemical. F. L. Padgitt, formerly director of project development at Tennessee Gas, is vice president.

Du Pont which has been buying acetylene from outside sources for nearly 30 years will build multi-million-dollar facility for manufacture of acetylene at site of its neoprene plant at Montague, Mich. Unit will produce acetylene from low-cost hydrocarbons, using modified-arc technique. Completion is scheduled for early 1963.

Goodrich-Gulf Chemicals, Inc., has awarded contract to design and build 20-million lb/yr synthetic rubber plant at Institute, W. Va., to the Chemical Plants Division of Blaw-Knox Company. Unit is expected to be operating by end of year.

Seven-year-old **Solar Chemical Corp.** has launched $5-million expansion program involving new products, new construction and research. Of total, $2 million is earmarked for construction, some of which is underway. Solar produces virgin crystal and high-impact polystyrene.

Toluene diisocyanate, basic ingredient for urethane foams manuafctured by **Nopco Chemical Company's** Plastics Division, will be principal product of $7-million plant on which construction has been started at Linden, N.J. When completed early next year, plant will make Nopco only foam producer with integrated supply of isocyanates. Design capacity is 10 million lb/yr expandable to 20 million lb/yr. Bechtel Corporation is handling engineering and design.

Succinic anhydride — on allocation until recently — is available in unlimited quantities from **Allied Chemical's National Aniline Division** as result of start-up of additional plant at Buffalo, N.Y. National Aniline's capacity has been doubled. ■

THAT'S INTERESTING

Stenos pace scientists?

One good secretary is worth two good scientists in the research race with Russia, according to Robert Sommer, Canadian expert, writing in Worm Runner's Digest, informal journal of the University of Michigan Department of Psychology's Planaria Research group. Sommer observes that "It is axiomatic that a lab can produce only as fast as its secretary can type."

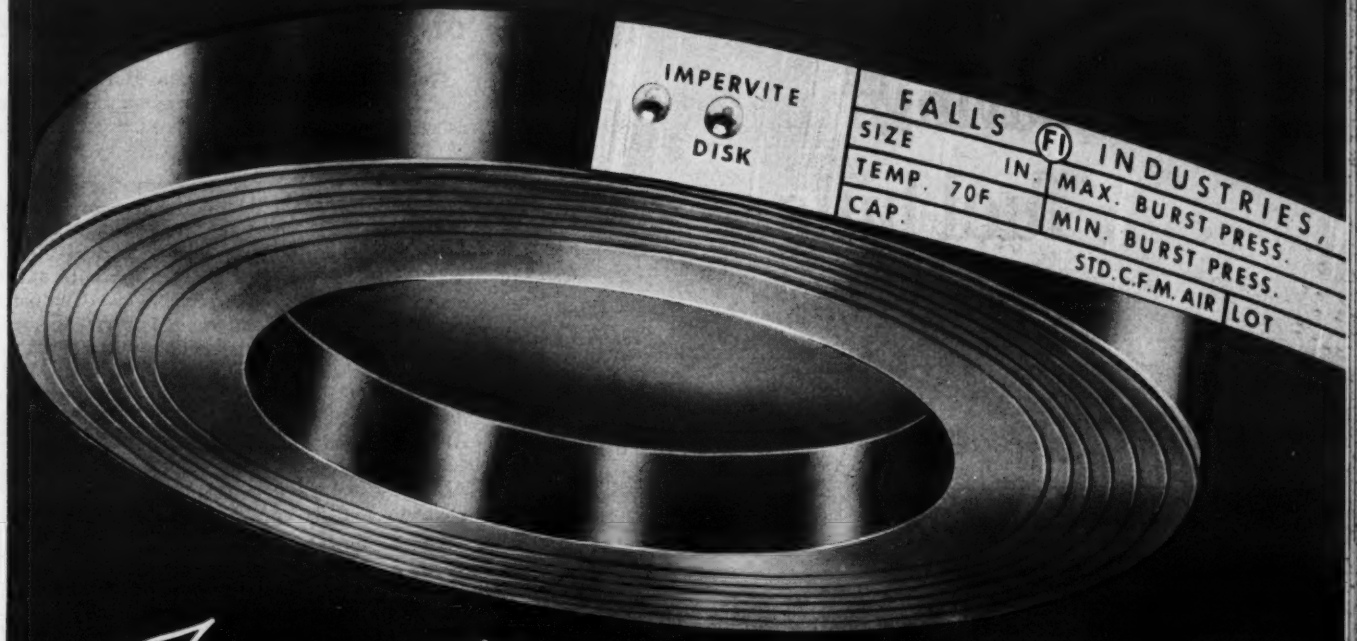
He points out that the scientist with four secretaries is kept busy keeping his harem busy.

Ag chemical comes high

One useful agricultural chemical costs $1.5 million and undergoes a decade of testing before being ready for market, G. L. Dennis, field sales manager of the Naugatuck Chemical division of United States Rubber Co., estimates.

For more information on product at right, specify 3231 see information request blank opposite last page.

. . . Perfect Overpressure Protection from FALLS (FI) INDUSTRIES



Impervite IMPERVIOUS GRAPHITE RUPTURE DISKS

From 1-inch to 3-feet, to 300 psi, to 1500°F.
Standards delivered immediately from stock

TRULY RELIABLE — because Impervite Disks do not fatigue, maintain constant burst characteristics at all temperatures — are immune to effects of thermal shock — are unaffected by action of practically all corrosives — provide ±5% burst accuracy — mount in standard A.S.A. flanges . . . are furnished in 4 standard types described at right.

STANDARD IMPERVITE DISK
HIGH TEMPERATURE ASSEMBLY TO 1300°F. (Depending on conditions)
VACUUM SUPPORTED DISK
TYPE "D" IMPLOSION/EXPLOSION DI

FALLS (FI) INDUSTRIES, INC.
AURORA ROAD SOLON, OHIO
Phone: CHurchill 8-4343 TWX: CGN-FS-720

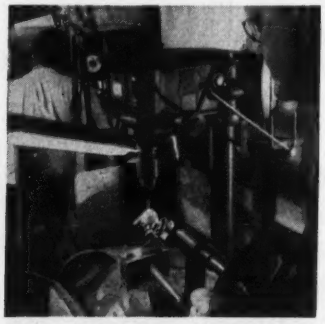
PRODUCERS OF BETTER PROCESSING EQUIPMENT FROM IMPERVIOUS GRAPHITE
Cubic, Tube and Shell, Cross-Bore, Parallel and Modular Heat Exchangers; Immersion Plate Heaters; Cascade Coolers; HCl Absorbers and Plants; Towers; Centrifugal Pumps; Ball, Control, Drain, Angle, and Diaphragm Valves; Rupture Disks; Pipe and Fittings; Crucibles; Thermowells.

dust control with 25% savings in fuel bills for Dr. Grabow

A demonstration of WHEELABRATOR'S

VITAL VALUES

A Wheelabrator Dustube cloth tube type Dust Collector ventilates all dust-creating operations at Sparta Pipes, Inc., Sparta, N.C., manufacturer of Dr. Grabow Pre-Smoked Pipes. Replacing an old, open dust bin, the control system not only solved the dust problem, but also cut fuel bills at least 25% through recirculation of heated clean air, and reduced building maintenance costs 15%. The high filtration efficiency of the Wheelabrator Dustube is just one example of the many Vital Values incorporated in all Wheelabrator systems which bring bonus benefits and multiple savings. For your dust and fume control problems investigate Wheelabrator. Write for bulletin 372 D.



Three floors of manufacturing operations are ventilated by a Dustube Dust Collector that has brought 5-way savings to Sparta Pipes, Inc.

VITAL VALUES FOR INDUSTRY

WHEELABRATOR DUST AND FUME CONTROL

WHEELABRATOR CORPORATION, 478 S. Byrkit St., Mishawaka, Ind.
In Canada, WHEELABRATOR CORP. of Canada, Ltd. P.O. Box 490, Scarborough, Ont.

Check 3232 opposite last page.

Spotlight On People

Riemer at U.S. Borax, Wilson of Armour now presidents

Hugo Riemer of United States Borax & Chemical Corporation and **Edward W. Wilson** of Armour and Company have emerged as presidents of their respective Corporations as a result of corporate shuffling.

Riemer, former executive vice president, moves up as a result of a request by his predecessor, **James M. Gerstley** to be relieved of some of his responsibilities. In newly created position as vice-chairman, Gerstley will have special responsibility for long-range planning and will preside at board meetings in absence of **Chairman F. A. Lesser** who does not reside in the U.S.A. Riemer joined U.S. Borax in 1958, resigning as president of Allied Chemical's Nitrogen Division.

At Armour and Company, **William Wood Prince** moves up to chairman of board while remaining chief executive officer. Wilson, who succeeds Prince as president was most recently executive vice president of Armour Chemical Industries, is credited with developing chemicals to present eminence in Armour's corporate picture.

Union Carbide Corporation has named a corporate vice president, a division president and a division vice president. **H. D. Kinsey** moves from presidency of Union Carbide Olefins Company to position as corporate vice president concerned primarily with planning, organization and evaluation of technical programs. He is succeeded at Union Carbide Olefins by **Paul L. Alspaugh**. **Logan B. Emlet** becomes vice president of Union Carbide Nuclear Company.

M. A. Weppner has succeeded **H. G. Sampson** as president of Central Solvents and Chemicals Company.

In major reorganizational move, Standard Oil Company of California has consolidated three companies, California Spray-Chemical Corporation, Oronite, and California Chemical Company, into one company to be known as California Chemical Company. Calspray will operate as Ortho Division; Oronite Chemical as Oronite Division. **Fred Powell** is president of California Chemical while **Howard Grady**, Calspray president, will continue as president of Ortho Division. Oronite will continue under its present management.

Dr. Henry C. Yutzy has been named vice president of Eastman Kodak Company, moving up from assistant director of Kodak Research Laboratory.

Three vice presidents have been appointed by Chemical Process Company. They are: **George F. Stoneman**, Ion Exchange Division; **H. H. Pomeroy**, Plastics Division; and **D. S. Catterson**, Adhesive Division.

Lansing M. Hinrichs has been named general manager, Girdler Catalysts.

Chemstrand Corporation president **Edward A. O'Neal Jr.**, has been named director of Monsanto Chemical Company. Chemstrand recently became a wholly-owned Monsanto subsidiary. **Fred G. Gronemeyer** has been named vice president and executive director, industrial development, of Chemstrand.

W. B. Jackson, has been promoted from manager of production department to manager of operations for Tar

a new line of Bulletin 709 motor starters by ALLEN-BRADLEY

- smaller size
- greater interrupting capacity
- even more millions of trouble free operations
- more wiring room
- elegant styling
- A-B "quality" throughout

A "family" of 7 starter sizes ... each one entirely new

greatest advance in motor control in 30 years

In appearance . . . in performance . . . in physical size and weight . . . these Allen-Bradley Bulletin 709 solenoid starters are *completely new in every way!*

NEW COMPACTNESS. Size reductions are so drastic you'll hardly believe your eyes. The tables below will give you some idea of how the new line of Bulletin 709 starters compares with the old.

A TREMENDOUS INCREASE IN LIFE—both mechanical and electrical. All of these new starters are good for many more millions of trouble free operations.

NEW PATENTED MAGNET. For its weight and size, the most powerful magnet used on motor control. Its short, cushioned stroke assures long contact life. A new, permanent air gap prevents any possibility of magnetic sticking. "Snap action" guarantees positive contact opening and closing.

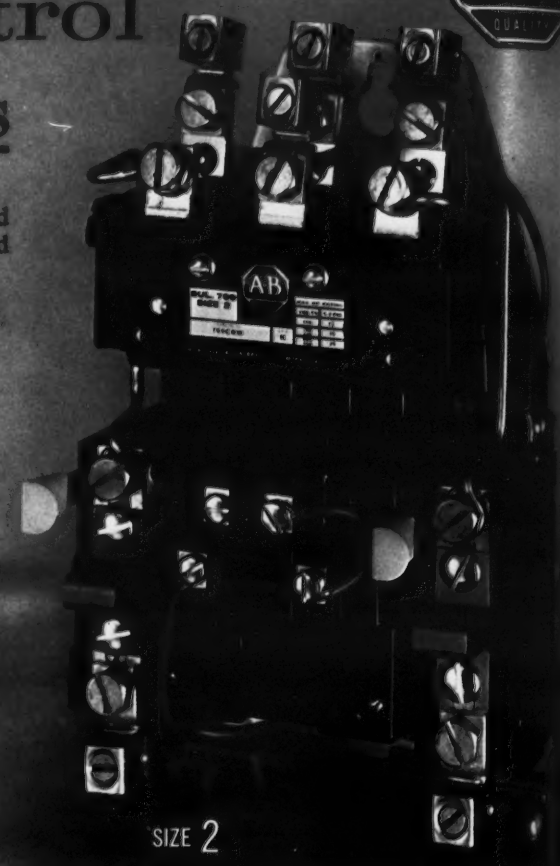
NEW MOLDED COIL. Impervious to atmospheres that could cause trouble, and also protected against mechanical damage. All coils are easily removed—from the front of the starter.

NEW CONTACTS. New double break contacts of cadmium oxide silver resist welding . . . close and seat firmly without sliding or wear-causing motion.

NEW OVERLOAD RELAYS. Not only "trip-free" but also "tamperproof," to reliably protect motor and machines. Of course the new relays were designed to use the old Bulletin 709 heating elements which you have in stock.

NEW ENCLOSURES. Completely restyled by Brooks Stevens—and so modern. They are a sales asset on any type of modern machine or industrial installation.

BETTER WRITE FOR MORE INFORMATION ON THIS REVOLUTIONARY NEW BULLETIN 709 STARTER!

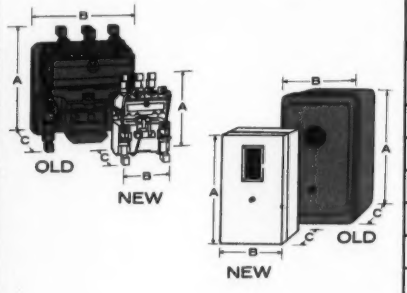


New Bulletin 709 Solenoid Motor Starter

CHECK THE "NEW" WITH THE "OLD" BULLETIN 709 DIMENSIONS

The wiring room in the new enclosures will delight the electrician.

Starter Size	OPEN TYPE STARTERS					
	NEW			OLD		
	Height A	Width B	Depth C	Height A	Width B	Depth C
00	3⅝	3⅜	3⁹⁄₁₆	—	—	—
0	5⅞	4⅛	3¹¹⁄₁₆	5⅝	4¾	3¼
1	6⅝	4½	3¹¹⁄₁₆	5⅞	5	3¼
2	7¾	4⅝	3¹¹⁄₁₆	10⅛	5¾	4⅜
3	10¼	6¼	5⅞	12⅝	7¼	5⅞
4	11⅞	7⅝	6¼	16¼	12¾	6⅛
5	14¹³⁄₁₆	9	6½	20	16¼	9¾



Starter Size	NEMA 1 ENCLOSURES					
	NEW			OLD		
	Height A	Width B	Depth C	Height A	Width B	De
00	7⅝	4⅞	4¼	—	—	
0	9⅛	6⅝	4⅜	7⅞	5⅝	
1	10	6¹³⁄₁₆	4⅜	8¹³⁄₁₆	6⅜	
2	12	7⅝	4⅜	14½	9	
3	16⅝	10⅜	7	19½	11⅜	
4	22	11⅝	8	26⅝	14⅛	
5	32¾	17⅜	9⅞	41½	19⅛	

8-61-59

ALLEN-BRADLEY

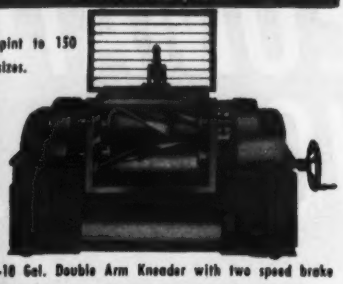
Member of NEMA

Quality Motor Control

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wisconsin

Leading mfrs. of
MIXING AND GRINDING EQUIPMENT
for over 90 years

• 1 pint to 150 gal. sizes.



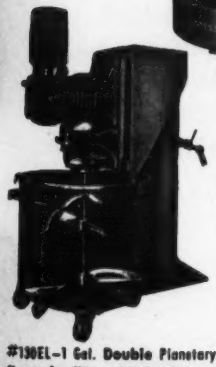
#41L–10 Gal. Double Arm Kneader with two speed brake motor. Jacketed trough and motor operated lift optional.

• 4½ x 10, 6 x 14, 9 x 24, 12 x 30, 14 x 32, 16 x 40" sizes.

#52TC–14" x 32" High Speed Three Roller Mill. Hydraulic adjustment and pressure recording gauges optional.

#30C–30 Gal. Heavy Duty Change Can Mixer. Adjustable outer scraper, cover with charging port, and gates on cans optional.

• 8, 16, 20, 50 and 60 gal. sizes.



#130H–250 Gal. Change Tank Mixer with hydraulic raising and lowering and variable speed motor. Various type stirrers and high speed impellers optional.

• 80, 150 and 250 gal. sizes.

#130EL–1 Gal. Double Planetary type Change Can Mixer with shearing action stirrers, and variable speed reversing type motor. Jacketed cans and portable trucks for cans optional.

• 1, 2, 3, 4, 6, 15, 25, 50, 65, 85, 110 and 150 gal. sizes.

Write for complete information!

CHAS. ROSS & SON CO., INC.

Leading mfgrs. of wet or dry grinding Mills, Kneaders and Mixers of all types — since 1869.

154 CLASSON AVE., BROOKLYN 5, N. Y.

Check 3233 opposite last page.

PEOPLE

Products Division, Koppers Company.

Dr. Edward B. Tooper has been appointed assistant vice president assigned to research, engineering, and production at DuBois Chemicals, Incorporated.

Dr. Hans Schindler has been advanced from production manager of Petrolia, Pa., refinery to vice president of Sonneborn Chemical and Refining Corporation, subsidiary of Witco Chemical Company, Inc.

Dr. J. Grove Baxter has been named director of research for Distillation Products Industries, Eastman Kodak Company Division.

Dr. William E. Kennel, manager-research of Amoco Chemicals Corporation, has been elected to Amoco board.

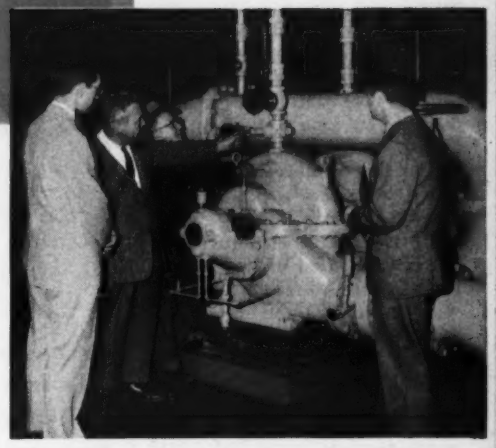
Officers of Stauffer-Hewitt, Inc., firm formed by Stauffer Chemical Company and Hewitt-Robins, Inc., to produce polyurethane foams, are **A. E. Albright,** president and board chairman; **P. B. Harris,** vice president and general manager.

Organizational changes to reflect Archer-Daniels-Midland Company's emphasis in agricultural and chemical fields have resulted in disolution of the Specialty Products Group and transfer of its divisions into company's other two major groups, Agricultural group and Chemical Group. Fibre, Equipment and Prochem Divisions join Agricultural group under direction of **E. A. Olson,** executive vice president. Federal Foundry Divisions and ADM Canada Ltd have been added to Chemical Group, headed by **W. G. Andrews,** executive vice president.

Allied Chemical has named two divisional vice presidents. **Raymond C. Baxter** becomes vice president-engineering for National Aniline Division while **Dr. Robert H. Reed** is new vice president-development, Solvay Process Division.

YOU GET BOTH FROM KUHNS

Kuhns D.I. fittings include pipe lock couplings (illustrated), flanges and screwed fittings, all pressure rated by Underwriters' Laboratories, Inc.



Kuhns technical team visits an installation prior to making recommendations.

DUCTILE IRON PIPE FITTINGS
PLUS TECHNICAL KNOW-HOW

Kuhns supplies more than ductile iron pipe fittings for systems exposed to corrosive materials, high pressure, thermal shock, vibration and severe usage.

Our technical team . . . engineer, researcher and metallurgist . . . is ready to tackle your piping problem right in your own plant, at no obligation. Knowing how, when and where to use ductile iron fittings is our main business. Our experience could be profitable to you. May we be of service?

THE KUHNS BROTHERS CO.
1800 McCALL STREET • DAYTON, OHIO

Check 3235 opposite last page.

For more information on product at left specify 3234 opposite last page.

letters from readers

Utilization of engineers: Is the Army doing a good job?

Proper utilization of our technical manpower is considered by many to be a key factor in the competition with the Soviets. It was therefore with great interest that we read a recent letter from a reader claiming that the U.S. Army is doing a poor job in this respect with their draftees. This letter and a rebuttal are reproduced in part below:

No!

Sirs:

In the December 1960 issue of CHEMICAL PROCESSING magazine ("Watching Washington," p. 14) you have a discussion by one Dr. John J. Grebe of Dow Chemical Co., concerning better use of national resource of knowledge and intelligence.

In it Dr. Grebe requests a better utilization of time spent in the armed forces by people with scientific and technical educations and backgrounds. Supporting this sentiment he cities the Chemical Corps. of the U.S. Army as leading the way in the field of highly specialized work.

Such a series of statements cannot go unchallenged. The individual (in the Army) cannot be *better* utilized by the military for industry's health. He becomes steeped in, or surrounded with, attitudes of time wasting, work shirking, and job-creating red tape.

His sense of technical values is—or can be—lowered considerably and in place of them are put the frills of the military. Those of us who have been in the position lauded by Dr. Grebe may be good scientific and technical employees, not because we were *in*, but because we are now *out!*

Citing an example of "highly specialized work being carried out by the draftees in the U.S. Army Chemical Corps," I wonder if Dr. Grebe was referring to the changing of dimensions on drawings

from ½ to 0.5" and ¾ to 0.75" and vice versa ad nauseam—a feat which many of us performed for our 21 months in the Chemical Corps?

It may do Dr. Grebe some good to see what the ESPP. program really entails rather than reading the *Army Times* and talking to West Point graduates.

CHARLES J. JAHNE, P. E.
Odessa, Tex.

Yes!

Sirs:

It would be foolish to assume that all men, or for that matter the majority of the men who get into the ESPP program consider it an opportunity of a lifetime to do unusually important work with great responsibility at such an early age, with a minimum of general background and scientific experience.

Even when a man has selected his field of future interests, has chosen the company and location from among many alternates, even when he is determined to make a career for himself in his new work, it takes many months for him to become useful. This is inevitable because he cannot be expected to understand the broad picture all at once, and then to enthuse about his little part in it. He doesn't even do minor jobs as expertly as the experienced analyst or technician.

For men who are drafted and fitted into a strange field often at remote locations, to enthuse over the opportunity to try to do difficult things and to become efficient, and to be determined to succeed, is a real measure of character and industry.

If I didn't know from intimate personal contact with a number of men who did achieve this attitude and did repay in a small measure the confidence and trust that the military staff has to put into such green help, I would not have said what I did.

Anyone who has the slightest understanding of the sacrifices and grief borne by millions of men before him to build up the freedom and op-

Arranges Happy Marriage

Between Electronic Controller and Pneumatic Control Valve

The advantages of the electronic controller can now be mated to the superior power and smooth throttling action of the pneumatic control valve by means of Masoneilan Model 8010 Electropneumatic Positioner — the most advanced device available for converting electric output signal to pneumatic positioner output.

Fidelity of positioning is assured because Model 8010 is a true positioner providing *direct* comparison of valve stem position with controller output signal, resulting in dynamic response and accuracy *not possible with any combination of transducer and positioner.*

Compatibility with any presently available electronic controller is obtainable because design provides for adaptability to all usual controller output signals.

Character of the design results in high open-loop gain and closed-loop stability. Balanced beam permits installation of the valve in any position without calibration shift.

You Are Invited to join the growing number of users who recognize the superior merits of Masoneilan Electropneumatic Positioners. The first step — obtain complete information. Get in touch with any Mason-Neilan office or representative; or write direct to

MASONEILAN

Products that work for your profit

MASON-NEILAN

Division of Worthington Corporation

25 Nahatan Street, Norwood, Massachusetts

DESIGN FEATURES

- Extra large stabilized magnet, plus efficient magnetic circuit, provides high-force changes.
- External stroke adjustment accessible without removal of cover — no exposure of electric wiring.
- High capacity relay for fast stroking speeds. Relay may be mounted in any one of four positions to facilitate piping.
- Balanced beam permits installation of valve in any position without shift in calibration.
- Available for 3-15 psi or 6-30 psi valve spring ranges and for split-ranging. Standard stroke ranges ⅜" – 3" and 2" – 4". Others available.
- Available with direct or reverse action and for direct or reverse actuators.
- Explosion-proof construction meets requirements of Class I, Division I, Group D.

PERFORMANCE DATA

Open-loop Gain* — approx. 100

Linearity—within ±1% of full stroke

Repeatability — within 0.2%

Load Sensitivity — output pressure change of 1.2 psi per 0.1% of full stroke offset

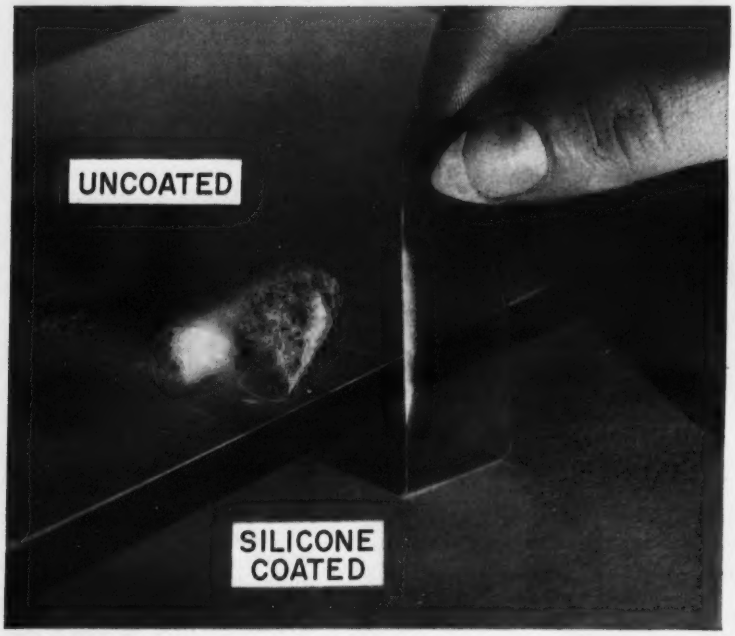
Supply Pressure Effect — ±1% of full stroke for ±5 psi change from 20 psi

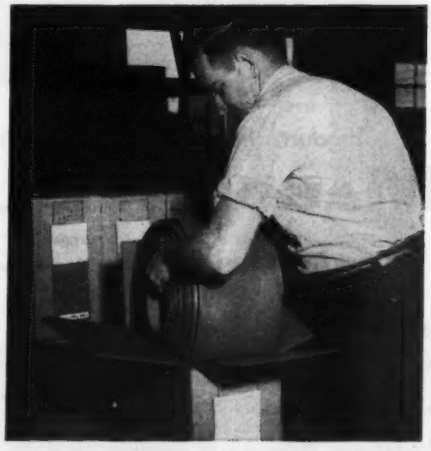
*Defined as $\frac{\%\text{ of full stroke}}{\%\text{ of full input range}}$

Check 3236 opposite last page.

SILICONE NEWS from Dow Corning

No Sticking Here!





New Silicone Coatings for Paper End Sticking; Save Time, Money

Sticky products like asphalt, dates, and uncured rubber have always been troublesome to pack, unpack or process. But that's all in the past for people who specify new Syl-off® silicone coatings for paper.

Even the stickiest materials are easily and cleanly removed from shipping containers made with Syl-off coated paper or paperboard. And there's nothing to compare with the ease of removing Syl-off coated separators from pressure-sensitive backed items — labels, decals, wallpaper . . . backing papers peel completely free without tearing. Syl-off coatings won't transfer or migrate, either . . . which means you can use coated papers as package wraps, liners and interleaving for food products.

WHO BENEFITS? You do! If you buy and use sticky materials, Syl-off means faster in-plant handling and processing. You get all the material you pay for and product losses are minimized. If you ship sticky products, Syl-off helps you create the kind of happy, satisfied customers who make the difference between profit and loss. You can actually save money, too, because Syl-off brand coatings weigh less than other release coatings which means lower shipping costs.

GETTING PERSONAL. Are sticky products giving you or your customers trouble? Can Syl-off help? Syl-off coated papers or containers can be engineered to your special needs by experienced mills and converters. Write now for list of Approved Sources. Address Dept. 2116.

Now Available: New Brochure— "How Silicones Serve the CPI" Write Dept. 2116.

first in silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

ATLANTA BOSTON CHICAGO CLEVELAND DALLAS LOS ANGELES NEW YORK WASHINGTON, D. C.

Check 3237 opposite last page.

LETTERS

portunity that our young men now have to enjoy, could not help but want to add his small measure of appreciation of the men living and dead who gave the full measure of devotion.

JOHN J. GREBE
Director,
Nuclear & Basic Research
The Dow Chemical Company
Midland, Mich.

Basic research belongs in universities

Sirs:

With reference to the article, "Is creativity lacking in industrial chemical research" (October 1960 CP), I would like to comment that the type of creativity required for really fundamental research is almost impossible to obtain within an industrial organization. It seems inconceivable that any person working in the research department of a business enterprise could be free of pressures to produce practical results directed towards the company's profit.

The entire organization of the staff of an industrial corporation is, of necessity, profit-centered. Even assuming that none such external pressures were brought to bear upon the researcher, he could hardly avoid a slant in that direction. After all, the profits of the company pay his salary.

On the other hand, our colleges should be ideally situated for just this kind of work. Unless the man is working under a direct fellowship (which he shouldn't be in any university), he is as independent of industrial pressures as a person can be.

He is actually under some pressures to produce publishable results of research which, however, need have no forseeable practical application but add to the fund of knowledge. Because of this freedom, it is my opinion that universities and colleges are the wrong places to do industrial research, particularly where the sponsor wants the results kept confidential.

The trouble is, colleges' and universities' research is hampered by the lack of adequate

To page 20

THAT'S INTERESTING

Push-button tub rub

Two to three seconds spray from an aerosol can containing a jet foam, a swipe with a wet sponge, and a rinsing with warm water takes care of the bathtub ring and similar housekeeping bogies.

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BULLETIN NO. 130

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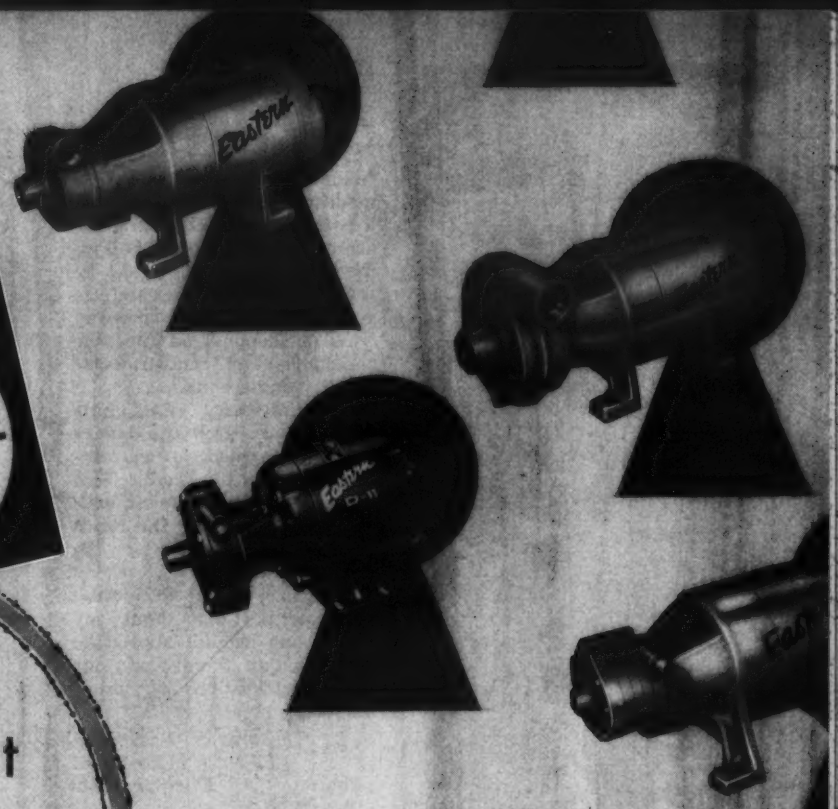

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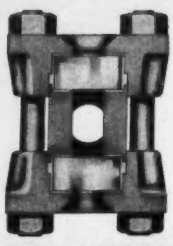

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LETTERS

From page 18

funds to carry on more than a modest amount of work, unless it is industrially (or Government) sponsored. I believe the ideal situation would be for all industrial research to be done within the company itself or sponsored by the companies at industrial-research foundations.

The university based fundamental research could very well be assisted to an adequate extent by grants from industries or government, with no string attached, the funds being administered by the university.

I realize there is nothing new or startling about my ideas, but would appreciate your passing them along for the consideration of other readers.

JOHN A. PATTERSON
President
Chempro, Inc.

recent books

Process Characterization written by professor H. I. Waterman, Technical University, Delft (The Netherlands), discusses graphical statistical methods of product distribution analysis in chemical and physical operations. The 140-page book consists of four chapters, abundantly illustrated with drawings and diagrams.

The proposed graphical methods are applied to the study and evaluation of catalysts. Attention is also given to the economical aspects of process characterization, with an eye towards reducing the number of necessary semi-commercial experiments.

(Further information about book, "Process Characterization", may be obtained from D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, New Jersey.)

Check 3240 opposite last page.

Current knowledge of the technology of perchlorates and perchloric acid are presented in one volume monograph. Leading authorities in the field trace the commercial development of the perchlorate industry on a world-wide scale. Properties, manufacture and safe handling are among the subjects examined. One entire chapter is devoted to the application of perchlorics in the explosive and

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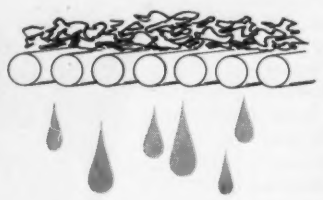

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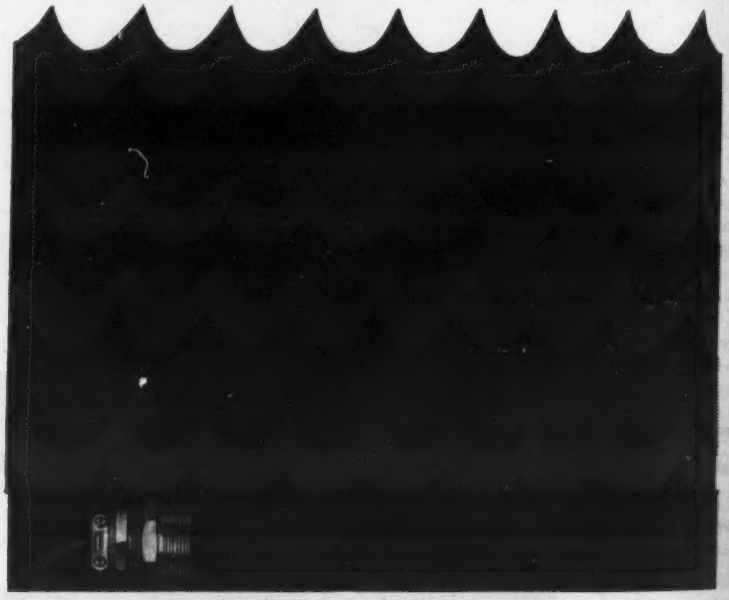

Check 3242 opposite last page.

propellant industries.

To obtain ACS Monograph Number 146 "Perchlorates Their Properties, Manufacture and Uses" remit $8.75 direct to Reinhold Publishing Corporation, 430 Park Ave., New York 22, N.Y.

A series of research subjects in the field of organometallic chemistry, reported on by the men performing the work, form ACS Monograph No. 147. Titled "Organometallic Chemistry," the book is not a comprehensive survey of organometallics, but presents a reliable account of contemporary research under active investigation at the present time.

Edited by H. Zeiss, it is the first major work on organometallic chemistry in over a decade. Fourteen experts report on research activities in their special fields. These include Carl Ziegler, Henry Gilman and G. E. Coates.

To obtain "Organometallic Chemistry" remit $17.50 direct to Reinhold Publishing Corporation, 430 Park Ave., New York 22, N.Y.

"Progress in Inorganic Chemistry, Volume II" completes this series on this subject. Some topics covered include: Radioactivation Analysis in Inorganic Geochemistry; Halides and Oxyhalides of the Elements of Groups Vb and VIb; and Metal Alkoxides. Also included is a cumulative subject index for Volumes I and II.

To obtain "Progress in Inorganic Chemistry, Volume II" remit $10.50 direct to Interscience Publishers, Inc., 250 Fifth Ave., New York 1, New York.

Check 3243 opposite last page.

Polypropylene's properties, production and applications are all treated in 268-page book authored by Theodore O. J. Kresser, Plastics Division, Technical Laboratory, Spencer Chemical Company.

Titled "Polypropylene," it is the 19th volume published in a series on plastic applications which started in 1957.

In keeping with other books in the series, it is written in concise, easy-to-understand language designed to be readily understood by readers without special training in polymer chemistry. It will be of special value to manufacturers and salesmen of products made of polypropylene, particularly those engaged in the packaging, appliance, automotive and housewares industries.

To obtain "Polypropylene" remit $6.50 direct to Reinhold Publishing Corporation, 430 Park Ave., New York 22, N.Y.

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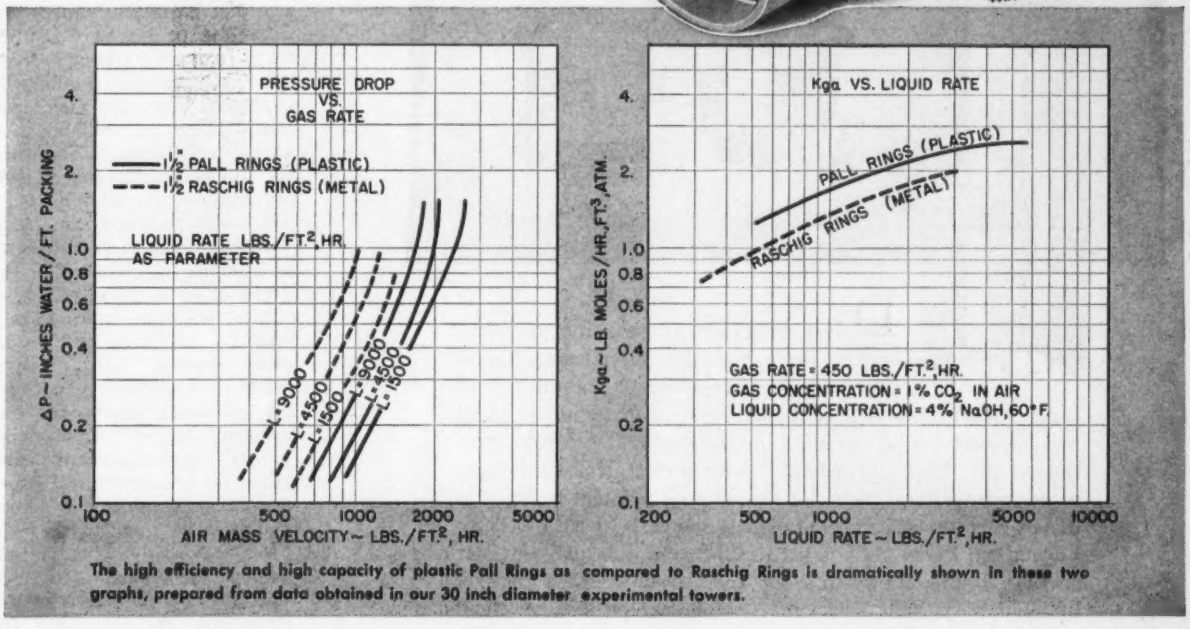
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Kga VS. LIQUID RATE
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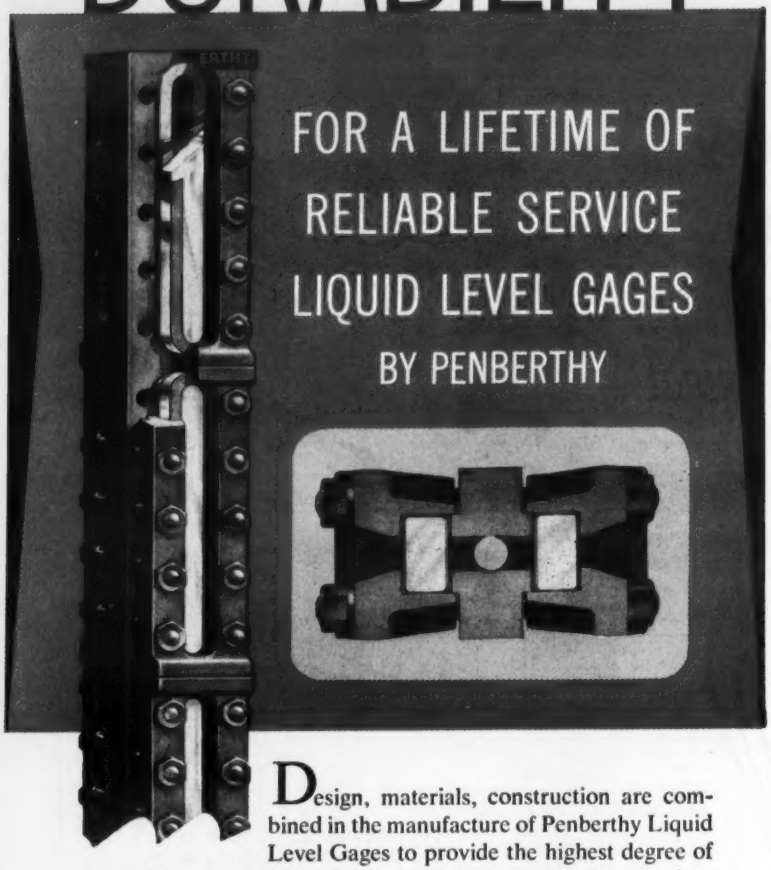
DURABILITY



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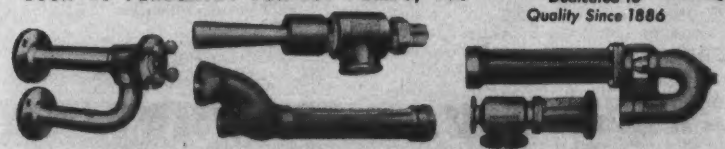

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Watching Washington

AEC Unveils Plans on Nuclear-site Evaluation

Firms planning nuclear-power or test reactors may soon have better guides to how the Atomic Energy Commission will evaluate data concerning proposed sites. The Commission has developed a set of guides to evaluating site suitability. They clearly tell industry, state and local officials what criteria the AEC will use in evaluating and interpreting data that must be submitted under Part 50 of the Commission's regulations.

Chemical processors moving into nuclear fields long have known what information on a site's suitability must be submitted under Part 50, but they have not known how the information would be evaluated. The AEC developed the guides in collaboration with the Advisory Committee on Reactor Safeguards, an organization charged by statute with assisting the AEC with minimizing the exposure of humans to radiation in the event of an accident.

Site selection and hazard analysis still will not be an exact science, but the new guide does suggest procedures for making calculations and suggests enough "reasonable values" for important variables that the chemical processor may be able to approximate fairly accurately the variables involved in the site he has selected.

The guide identifies factors considered by the AEC and suggests criteria for evaluating their safety. Principal factors:

1) Population density surrounding the site, and the nature of activity, such as farming, industrial, or residential.

2) Physical characteristics of the site, including seismology, meteorology, geology, and hydrology.

3) Characteristics of the proposed reactor, such as maximum power level, and intended uses of the reactor.

4) Exclusion area (immediately surrounding the recator) which is at all times under full control of the reactor owner.

5) Low population zone surrounding the exclusion area.

6) Population center distance.

The detailed guide was published in the Federal Register on February 11 for comment by industry and the public. Persons who wish to comment or make suggestions have 120 days from that date to write to the Secretary, U.S. Atomic Energy Commission, Washington 25, D.C. Attention: Director, Division of Licensing and Regulation.

Pollution control: A slow start

Water- and air-pollution control will grow more important under the Kennedy administration, but it will be slow getting underway. The President wants more money spent on pollution control, tighter and tougher laws, and more "cooperation" with the states which might well take the form of monetary incentives.

However, before the programs outlined last month by President Kennedy can move into high gear, the Administration wants to concentrate on other health-welfare type programs that have considerably higher priority. Kennedy and his Secretary of Health, Education and Welfare, Abraham Ribicoff, will focus attention almost exclusively on unemployment benefits, medical care for the aged and education.

Then, Kennedy will go to industry either with a plea for cooperation, or a demand for compliance. The President is on record as feeling that industry is not contributing

enough of the money for the fight against pollution. He believes the total is too small, it must be increased considerably, and industry should bear the burden of the increase.

This is the Administration's way of seeking an expanded program in the welfare sector, without encountering tax-stimulated cries of "welfare state."

Bloom is fading on nuclear-heat hopes

Nuclear reactors for low-temperature process heat in the chemical-processing industries may not be as practical as government and industry once brightly painted them. This is the conclusion of a long-term Atomic Energy Commission study revealed by Frank K. Pittman, Director of AEC's division of reactor development. Pittman says this is primarily because of high initial cost and capitalization techniques used by potential operators.

Further, the AEC believes that reactors for high temperature process heat and radiation-induced chemical reactions also are still some distance in the future. Pittman says they are technically feasible now, but will not be economically feasible until even greater technological background has been gathered.

The AEC is continuing its research program on small reactors for central-station use, and low-temperature process-heat reactors. Objective is to reduce costs.

Nuclear waste declared a private matter

Nuclear-reactor operators no longer are permitted to accept radioactive waste from other persons for burial with the operator's own waste. Such an amendment to AEC Rules Part 20 (standards for protection against radiation) went into effect late last month.

Reactor operators may continue land burial of waste from their own reactors, but no longer can bury, on private land, waste sent to them from other reactors. To fill the gap

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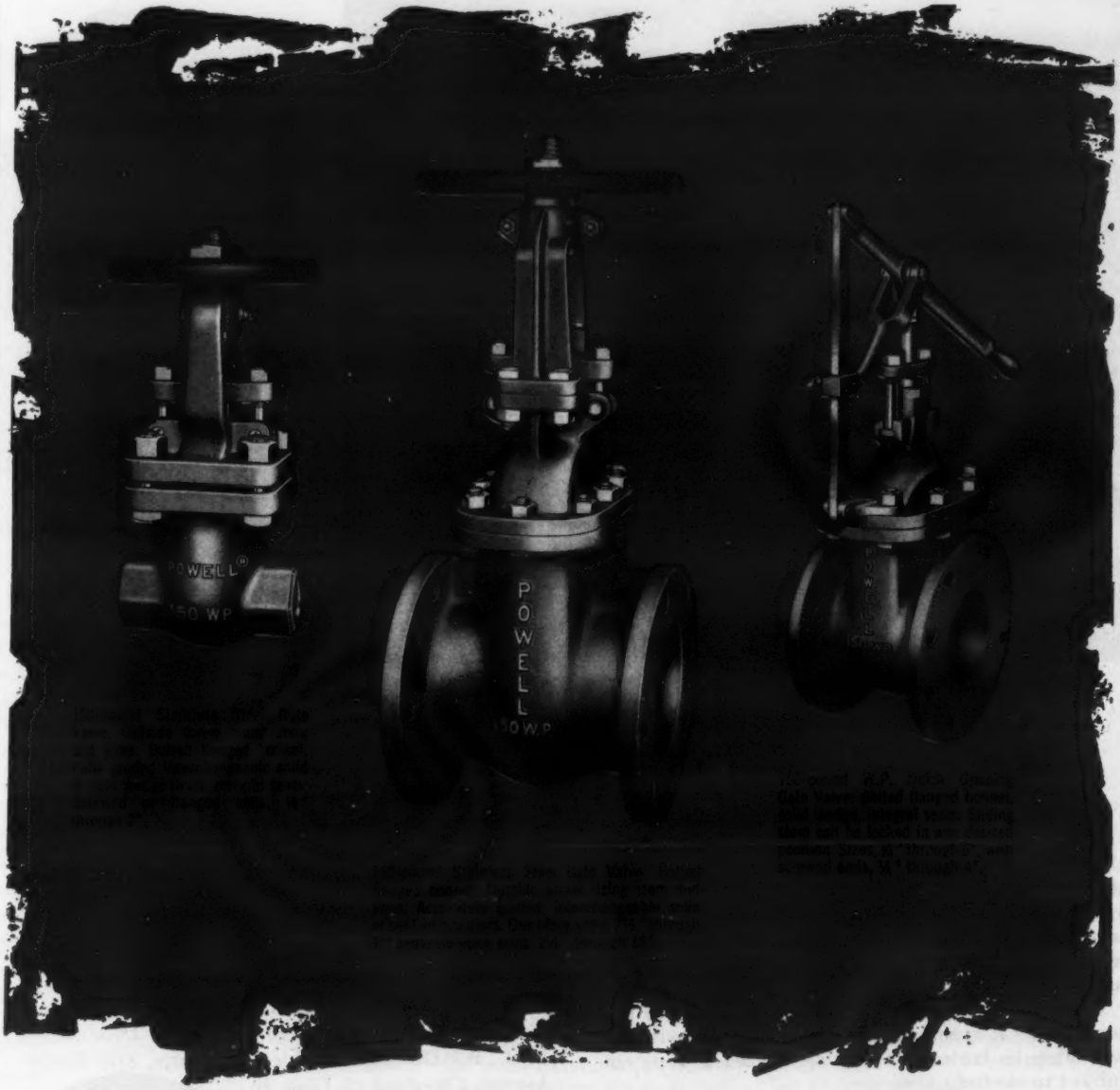
Powell valve performance really pays off for the chemical industry. Take "reliability" for instance.

Powell reliability starts with good design features specifically tailored for chemical installations. For example, there is a deep stuffing box for an extra amount of special packing. And valve bodies are designed with full flow areas for maximum flow conditions and minimized pressure drop. Also, wedge discs are precision machined and fully guided to eliminate drag and wear of the seating surface as well as undue vibration.

You get thorough valve engineering like this—plus, industry's widest selection of valve materials, both ferrous and non-ferrous, so that Powell valves can withstand virtually any problem of corrosion, erosion, temperature or pressure. Whatever your valve requirements—look to Powell.

All this adds up to reliability that gives a performance pay off to you. Get the full story from your nearby Powell Valve distributor, or write The Wm. Powell Company, Cincinnati 22, Ohio.



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This conduit is Kraloy Rigid PVC Conduit manufactured of Geon by Kraloy Plastic Pipe Company, Santa Ana, California. Like the conduit, fittings are unplasticized PVC. B.F.Goodrich Chemical Company supplies the rigid Geon vinyl.

Conduit made of rigid Geon gets UL-approval for underground service

The manufacturer of this conduit has obtained Underwriters' Laboratory approval for underground installations. Conduit of Geon vinyl is ideal for such applications, since it follows ground contours without costly grading. Rigid vinyl conduit has plenty of impact resistance to take earth or other shocks and is easy to handle and install.

Geon makes the conduit resistant to corrosive soil conditions—it is not affected by concrete, in which it will often be buried. No coating is needed. It is not subject to electrolytic action.

The installation story is even better. Weight is cut to half that of lightest-weight metal. Solvent welding can eliminate threading. Joints are permanent, clean, waterproof. Wire pulling is far easier because inner walls are extra smooth, and stay that way.

Vinyl won't support combustion and is non-sparking—these are more of the reasons Geon helps this manufacturer explore new applications. Rigid Geon makes excellent pipe, too. For more facts, write Department NJ-2, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. In Canada: Kitchener, Ontario.

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Geon VINYLS

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that may be created by this rule change, AEC is prepared to develop regional sites for permanent disposal of low-level radioactive wastes on Federal or state lands. Here, the wastes would be under strict long-term control.

U.S. Mineral Production up 4% over 1959

The nation's mineral production last year was up four percent above 1959. The year's output was valued by the Interior Department at $17.8 billion, second only to the record high of 1957 when output of minerals in the U.S. was valued at $18.1 billion.

Metals production last year was up 28% over strike-ridden 1959. Non-metals except fuels dropped, but fuel production climbed enough to result in a net 2% increase in production of nonmetals. Demand for construction materials slackened, but this was partly offset by increased demand for chemical and fertilizer materials. In the semiconductors field, silicon, germanium, and tellurium production was up, although selenium output dropped drastically.

Boron minerals and compounds dropped slightly in quantity, but total dollar value was up a little. The Interior Department attributes the tonnage drop to a decline in consumer demand for refrigerators, stoves, bathtubs, and other items using boron compounds in ceramic coatings. The dollar-value increase is accounted for by rising demand for glass fibers to reinforce resins. Boron compounds are used in production of fiber-glass.

Bromine was down 10%, due to the impact on gasoline consumption of compact cars which use less gasoline and do not call for tetraethyl lead-ethylene dibromide anti-knock mixtures.

The increased use of kerosene-burning jet aircraft also dented another market for bromine-gasoline compounds. (Wall Street Tip: Although bromine sales went down last year, and may continue to do so, Interior notes that bromine capacity went up.) ■

OPERATING MANAGEMENT'S OWN MAGAZINE

CHEMICAL PROCESSING

April 1961

JAPAN

Efficiency and quality being stressed as labor-cost advantages dwindle

Duane Dickason from Ewing Galloway

An alert, competitive chemical industry is relying heavily on automatic control of modern processes to counter shortages of skilled labor and raw materials

By **JOHN MELLECKER,** Editor-New York

The land of lowest labor costs is now seen by its leaders as critically needing most advanced innovation and automatic control for its chemical industry to overcome rising competition they are certain will come from the outside, particularly from the United States. In this analysis, based on information published in Japan and observations of process industries executives who have had direct experience with Japan's postwar chemical expansion, one may be aided in understanding the factors which enable these amazing people to achieve profitable operation in spite of grave disadvantages.

JAPAN, embarked upon becoming a major producer of world chemicals, is already cutting a wide swath. In petrochemicals alone this ambitious nation's plans (*1*) call for capacity by 1970 equal to what ours was in 1955.

Such facts are very much on the minds of our industry leaders, who, being confronted with difficult-to-meet world price competition from nearly every direction, have been previously reported in CP as engaging in a good deal of analysis on their own part to better understand how manufacturers in other countries — notably Japan — can get the results they do, considering the disadvantages they have to cope with. What is this analysis indicating with respect to Japan? CP undertook getting the answer to this question by going to many of the same sources.

Take the question: Is Japan able to produce chemicals more cheaply because of low labor costs? Our questioning led to the finding that this actually has little effect on the industry's economics, and that Japanese leaders' decisions are based on the assumption that whatever advantage exists in this area will rapidly disappear.

The truth is that the Japanese chemical industry, coordinated as it is by the Government through the Ministry of International Trade & Industry (MITI), is importing only the most advanced processing know-how from the U. S. and Western Europe. This is obtained in the form of process engineering studies, often under licenses.

Skilled Japanese technologists analyze these studies, asking their suppliers for full justification for each step representing advanced technique. Decisions to adopt these techniques into the project design engineering (done in Japan) are based on whether real advantages might ensue, now or later, for owner or nation. MITI sees that the nation's industry gets — for the experience — something of each foreign alternative, even though (as in the case of urea) a satisfactory process might be available within Japan.

Recently, MITI has begun requiring that foreign processes must be demonstrated as practical in operating plants before approval will be granted for their importation.

Overcoming World Attitude About Quality

Japan's leaders have evidently decided that to maintain their present favorable

(1) According to *Tokyo Mainichi*, a leading newspaper.

日本化学工業

balance of payments in the world market, emphasis must be made on quality of products exported. This explains why their chemical industry is spending considerable sums for the very latest in chemical process instrumentation while continuing to withhold many personnel convenience features typical of the same plants in the U. S.

In other words, the world is to know that Japanese chemical products will be made to exacting specifications, using modern continuous processes equipped with the same controls as employed by most advanced U. S. and European manufacturers.

Although this is undoubtedly an impelling reason, it is by no means the only employed in the thinking of the hard-headed Japanese businessman, who sees only problems ahead as regards the cost of skilled labor. In short supply, even what is now available is not necessarily cheap.

Any nation that is undergoing rapid industrialization in the modern sense and cannot draw upon large numbers of people having as youngsters a mechanical or otherwise technical background is at a disadvantage. In other words, the kids of Japan are just beginning to be exposed to tinkering with cars, TV sets, and the like.

This factor, according to one source, has made it extremely difficult for the Japanese employer-manufacturer to train his workers to be mechanically precise in their operations. Once trained, the workers do as well as any others, but the training period may be long — as evidenced by the experiences of process control instrument manufacturers, some of whom are reported to find it necessary to supply calibration and maintenance services for longer periods during plant startup than they would in the United States.

As such skills are acquired through formal education processes, the price paid by the employer for such skills is understandably higher. This likewise means that more skilled workers tend to be available in the cities rather than where some of the industry's plants are situated, and relocation adds to costs. The newest measure to counter this problem is the development of "industrial parks" by major companies who will locate their plants close to one another's, and will supply attractive nearby housing for skilled workers.

Certain national political factors are also affecting the cost of skilled manpower. The Government's recent pledge to double the earning capacity of the Japanese people within ten years has tremendously stimulated the economy and caused MITI to function accordingly in its projections and authorizations for allowable industrial capacity expansion. The larger companies are responding by granting wage, salary and bonus increases which are amounting to about 10% a year.

Why did the Government stick its neck out, and why do the industries go along? To counter communism, indicates the Japanese financial press. The riots of not so long ago are said to have firmed any feelings that such a program might be essential.

Unions and the Closed Loop

Then too, there are the labor unions which sprang into being at the end of the war. As they have acquired more power they have become more difficult to bargain with. In a nation where so much of the employer-employee relationship is based on rigid tradition, the addition of the labor union type of extra rigidity is probably more than many employers feel they would care to get increasingly involved with, given any alternatives. Thus, the "black box" of closed-loop computer control, although not easily acquirable, assumes real attractiveness.

Part of this tradition makes it virtually mandatory for an employer to keep an employee for the remainder of his or her life, often supplying housing, hospitalization, and so on. Conversely, an employee "takes on" an employer for life, and is said to customarily make no attempt to job-hop.

Raiding and industrial espionage (through "planted" employees in competitors, facilities) are said to be virtually unknown. But, conversely, mobility of skilled labor — based on willingness to leave an industry growing obsolete and gain experience by "working around" — does not take place. Thus the modern employer, striving to handle the

Japan Chemical Week

Weekly International Air Edition of *THE CHEMICAL DAILY*

Vol. I No. 33 December 15, 1960

Isoprene Technique Introduction From France Kept Pending

Mitsubishi Chemical Industries has submitted an application to MITI to introduce isoprene manufacture technique from France.

MITI considers that this application should be kept pending. As previously reported, isoprene manufacture of a similar type is under study by the combined research group of 4 companies "Mitsubishi Chemical, Japan Synthetic Rubber, Showa Denko and Chiyoda Engineering" in co-study with the Government Research Laboratory.

Inasmuch as the induction of technical information from France by Mitsubishi Chemical covers an option contract which is expected to result in business enterprise in future, it is feared that the introduction of this will adversely effect the co-study work being carried out in Japan.

Thus, before approving Mitsubishi's application MITI will investigate whether the co-study group expects to continue their study in earnest.

Domestic Similar Type Process Under Study By 4 Companies

Agency of Industrial Science and Technology will instruct the Resource Research Institute to hasten the completion of the development of the isoprene manu- headed and the Institution.

This is a competitive process to that of the State Petroleum Research Institute of France for manufacturing isoprene. Mitsubishi Chemical and Ube Indus- applying to introduc-

maidehyde to form dimethyl methadioctane, and by catalytic thermal decomposition of this intermediate, isoprene is obtained.

The Amenomiya process starts with molecular ratio of ethylene and propylene 1:1 to form 2-methyl butene-1, and isoprene is obtained by dehydrogenation of this intermediate.

Japan has a vigorous daily newspaper serving the chemical field. Reproduced here is a front page of its weekly international air edition

latest complex processing plants, is handicapped by lack of experienced operators other than those trained in his own company.

So, the process-operating "black box" offers a way out of a delicate situation. Many companies are known to have set up studies in this new technological area. Iron and steel industries are said to be in the lead, but with chemicals and refining close behind. One steel plant is understood to be installing a control system directly connectable to a closed-loop computer at a later date. So far, each company treats the subject as top secret. But observers are convinced that when one takes the leap, others will plunge with the full competitive vigor of the Japanese businessman.

As a recent issue of *The Japan Stock Journal* put it, "The current quest among Japanese businessmen and industrialists for foreign know-how has become startling. Competition to acquire such intangible assets has almost reached cut-throat proportions, and MITI is very much concerned.

"Last year the Foreign Capital Induction Council was requested 324 times to sanction such transactions. This figure represents an increase of 70% over the previous year, according to a MITI survey . . . almost 70% of the proposed deals were with American firms . . . chemical industry was (with steel) chiefly concerned . . ."

Competition for know-how, and how it involves MITI, is exemplified by the front page of Dec. 15, 1960, *Japan Chemical Week* (see reproduction). One firm is reported therein as having applied for a permit to introduce an isoprene technique from France. This application was followed by a similar one from a competing Japanese manufacturer.

But MITI is holding up action until it determines the outcome of a Resource Research Institute study sponsored by four Japanese companies to develop the "Amemiya" process — described as producing isoprene by dehydrogenation of an intermediate formed by reacting equal quantities of ethylene and propylene, lowest cost raw materials. The French process is described as requiring isobutene and formaldehyde, more expensive materials.

Innovation Improving

Although much emphasis has been given to Japan's rather frantic striving for know-how from abroad, CP's advisors were unanimous as to the competence of Japan's chemical technologists in being able to carry the development of modern processes into forms more advantageous locally and also exportedly. A survey (2) has indicated that even more than a year ago, Japan had some 305 chemical processes available for licensing. One of the more noteworthy examples of a U. S. plant based on such a process is that of Air Reduction at Calvert City, Kentucky, making polyvinyl alcohol.

Tight Little Islands

When one considers Japan's extreme shortage of raw materials, that nation's ability to produce and export chemical products at a profit is nigh unto amazing.

Take, for example, petrochemicals and nitrogen-based fertilizers. It was for petrochemicals that MITI in 1955 set these goals for its first five-year plan (3):

1) Supply raw materials of good quality to the rapidly growing synthetic fibers and resins industries.

2) Produce petrochemicals presently entirely dependent on overseas supply and whose imports were still increasing, and

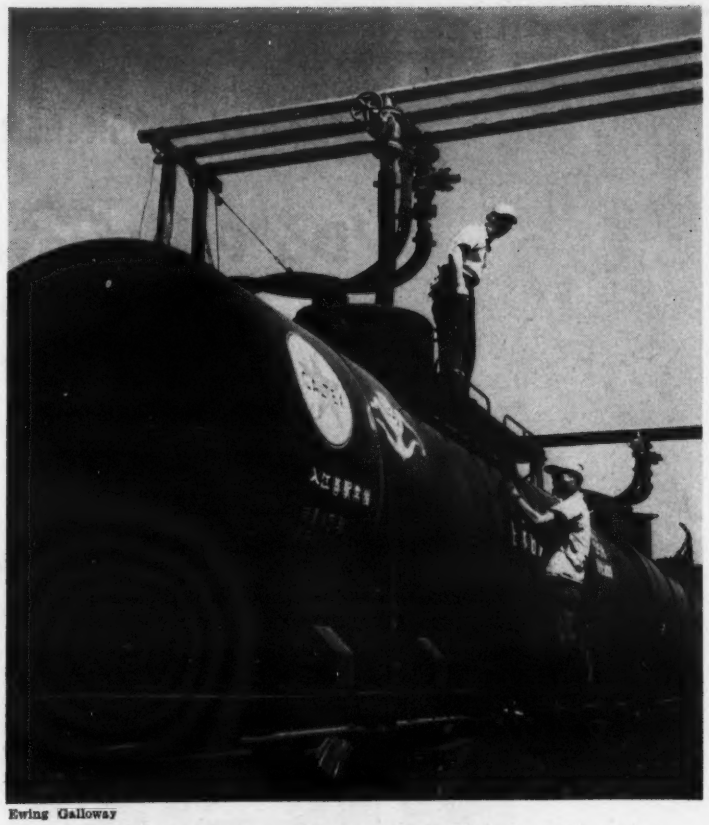
3) Achieve price lowering of raw materials for the major chemical industries to world levels through introduction of petrochemicals.

Now that this stage of expansion is complete (1960), 16 plants of 15 companies are producing the following ethylene derivatives: Polyethylene, ethylene oxide, ethylene glycol, secondary butanol, methyl ethyl ketone, isopropanol, acetone, benzene, toluene, xylene and phenol. Stone & Webster has had a major role in plants supplying purified ethylene, and Scientific Design, Inc., in petrochemical intermediates plants.

To make this program possible, ethylene had to be produced by cracking of petroleum naphtha. Reason: The petroleum industry, though growing, is primarily devoted to fuel oil production rather than gasoline. Result is inadequate production for years of refinery byproduct gases.

A second-term program, begun by MITI in 1960, features (in contrast to production of ethylene derivatives with notably polyethylene as the core) polypropylene propylene glycol, and dodecyl benzene derivative of propylene, as a core, in addition to expansion of materials initiated earlier.

Such an ambitious program requires major expansion of naphtha-cracking capacity, to provide the necessary ethylene and propylene. In October 1960, MITI announced extensive naphtha-cracking expansion projects, goal of which is to "reduce cost of olefin production to internationally competitive level."



Ewing Galloway

Symbolic of Japan's burgeoning petrochemical industry is this tankcar carrying the trademarks of partners, Caltex and Nippon Oil Company

Fertilizer, Too

The fertilizer industry has likewise been handicapped by high cost of raw materials. In this connection, CP is indebted to Drs. L. C. Pan and K. T. Lee of Chemical Construction Corporation, New York, for

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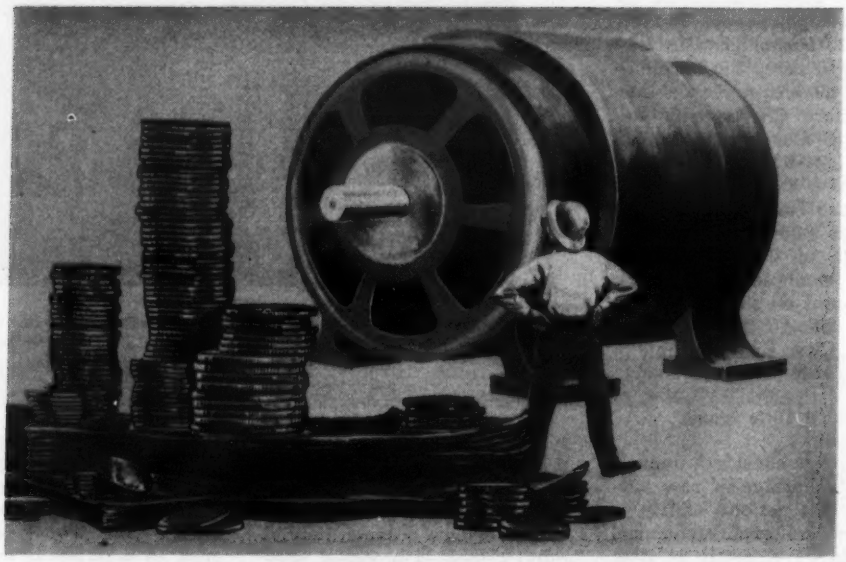
(2) *Chemical Week*, Feb. 20, 1960.
(3) Courtesy Nikko Securities Ltd.

CHEMICAL BUSINESS

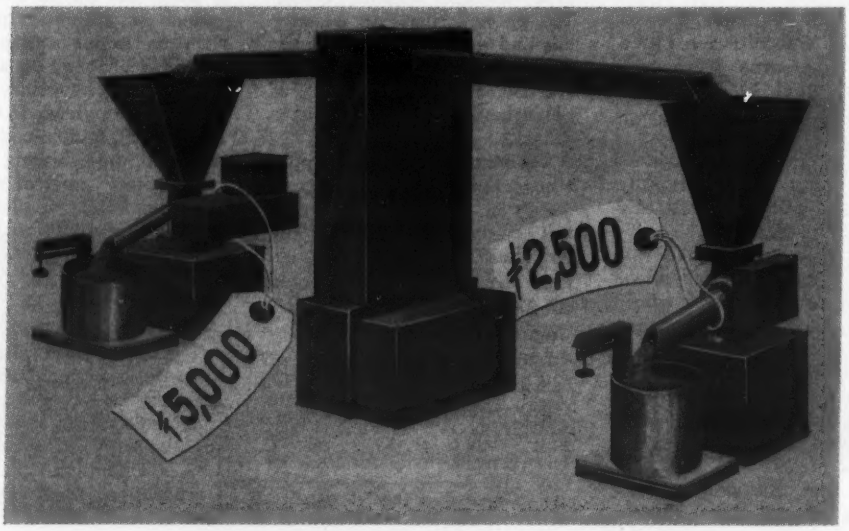
VALUE ENGINEERING . . . new tool for operating management

Du Pont saves $1 million in three years

By **WILLIAM R. CAMPBELL JR.**, Test Supervisor
Engineering Department
E. I. du Pont de Nemours & Co.



Six to eight dollars is returned for every dollar spent in testing and evaluating equipment and materials



In one case, tests conducted under value engineering program demonstrated that a $2500 feeder performed satisfactorily in some operations where a $5000 feeder had been used previously. With 10 such installations per year, $25,000 is being saved here

IF YOU have a choice between several valves for a specific application, how do you tell which one would be the best buy? Such decisions are usually made in a more or less informal way and are based on procedures that vary widely from plant to plant. The result is that a company usually spends more than necessary for many pieces of equipment or products. (Normal procedure is to play it safe, when you're not exactly sure, and buy a higher priced item than is required for a particular application.)

Du Pont started doing something about this situation three years ago when the company set up a centralized, formal program, called value engineering, for testing and evaluating such equipment and materials. The program has brought savings of more than a million dollars since its inception, with six to eight dollars returned for every dollar spent on the program. Since less than 3% of the susceptible items have been investigated so far, potential savings are much greater.

Applies to Low-cost, High-volume Items

Of the $140 million Du Pont spends annually for chemical

Technical paper, "Analyzing the Value in Process Engineering Commodities," by the above author, was presented at the Winter Annual Meeting of The American Society of Mechanical Engineers in New York City on December 1, 1960.

with EQUIPMENT-EVALUATION program

Central group compares competing low-cost items used in quantity throughout company, recommends "best buy"

equipment and products for construction and maintenance, about half is for equipment relatively high in cost and purchased in small quantities. The other half is for items low in cost but used in large volume. First group consists of such units as large compressors or evaporators which cost enough to justify spending engineering time in evaluation each time a purchase is being considered.

The second group includes such items as gaskets, gages, fittings and other products that cannot justify individual testing each time some of them are needed in a Du Pont plant. This group is the one to which value engineering is applied.

Previous Selection Methods Had Pitfalls

Prior to the establishment of the value-engineering program at Du Pont, the low-cost, high-volume equipment was chosen on basis of experience, manufacturer's claims and in-service trials in plant. Experience is an excellent guide but cannot tell one much about a new product. Also, sometimes several years is required before an item is considered to have proved itself on the basis of service. Favorable experience sometimes can preclude trying another type of product which may cost only half as much and do just as good a job.

Manufacturer's claims are of value for study but naturally are sometimes over-optimistic. It is not always possible to obtain required information from manufacturer's literature.

In-service or plant trials of equipment have their place but do not usually work out for the best unless concentrated attention is given to them by a group not concerned with production. Since plant's first order of business is to manufacture the product, such in-service trials take a back seat. Information obtained is usually confined to the plant and it takes too long to get the results.

For example, one such plant tried out a new type of steam trap for two years before a decision was reached to use it extensively. A test facility could have obtained the same results in two months. Since the steam trap was lower in price than those being used, $150,000 could have been saved had the results been available in two months instead of two years.

In order to overcome such deficiencies, the value-engineering program was set up by Du Pont.

How Value Engineering Operates At Du Pont

Program at Du Pont is organized under the direction of a full-time value-engineering coordinator, who has a small staff that works with him on a regular basis. In addition to the regular staff, the value-engineering group works with specialists who will consider an item from various viewpoints. For example, a maintenance man judges how easily a unit can be lubricated or repaired. A production representative considers performance of unit. A corrosion engineer notes materials of construction and finish. Safety is a prime consideration.

In making a comparative appraisal of items, testing is held to a minimum and sometimes is not necessary at all. In many cases, the quality of a unit can be evaluated by inspections made by the various specialists.

Before an item is subjected to value engineering, the number of such items purchased in a year and the price spread among different manufacturers are noted. Price spreads of as much as four to one are experienced. Calculations are then made to see if value engineering is justified.

The minimum price for an item is subtracted from the average price being currently paid for the same item. Past experience indicates that about 25% of this difference can be saved. Hence, by multiplying the difference by 0.25 and then by the number of items purchased in a year, the expected savings are obtained. Savings divided by cost of value engineering gives return expected. If a return of six-fold or more is indicated, arrangements are made to proceed with the program.

Here's how an analysis is made of a number of comparable items. The group convenes and each specialist gives his appraisal of each unit considered, based on tests or his expert knowledge. The group then reaches an agreement on the order of preference with respect to quality, performance, safety, maintenance, etc. The preference is expressed as acceptable or not acceptable. Comments on each item considered are incorporated in an informal report. This re-

What is Value Engineering?

Value engineering is a technique applied by a group of specialists in testing and appraising comparable types of equipment and materials to arrive at a quality rating for each item. By considering cost along with quality, a recommended best value is obtained.

port is binding on no one. User makes final selection.

A resume of the results of appraisals is announced bi-monthly through an advisory report to about 500 people at over 100 plants and laboratories within the company. Those interested in details can request the informal report prepared for each appraisal.

The confidence of those using the results must be established and maintained. This confidence stems from the use of recognized specialists in the program and in past successful applications. Close personal contact and visits by members of the value-engineering group to the various plants and laboratories also increase this confidence and interest in the program. Proper communications are vital.

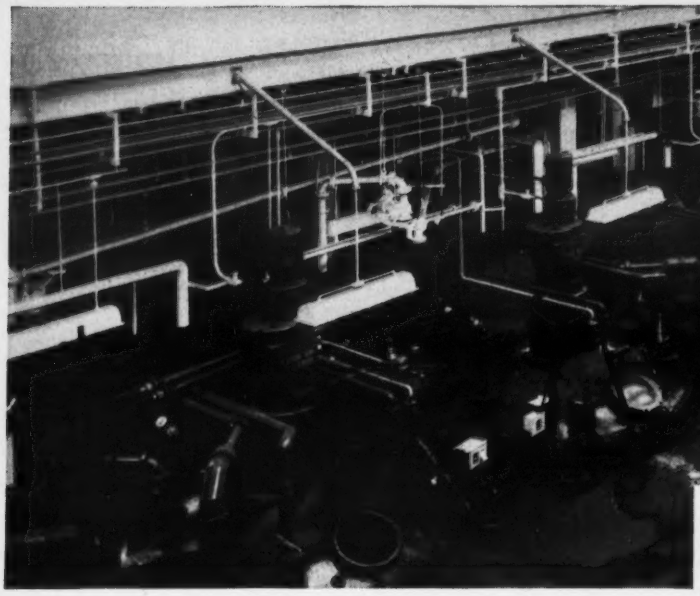
Cases Indicate How Value Analysis Pays Off

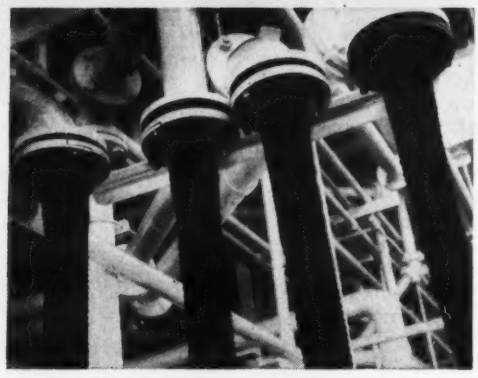
Here are some examples of how value analysis has been used to advantage at Du Pont. In one case, tests on pneumatic-tube fittings for plastic tubing resulted in a 20¢/item saving. Since 70,000 such fittings are used annually by company, savings of $14,000 per year are possible.

In another case, a price spread of two to one in temperature gages involved well-known, widely used gages and one newcomer to the field. Tests revealed that the new unit was equivalent to the old standbys and cost $15 less. Since 3000 gages of this type are used for new construction alone, at least $45,000 is being saved per year on these units.

In a third case, a test demonstrated that a $2500 feeder would suffice for some applications where a $5000 feeder had been used previously. Since this information was applicable to 10 such installations a year, $25,000 annually is being saved here. In another case, substitution of one type of positive-displacement feeder for another increased downstream equipment efficiency by 50%.

In many cases the group recommends equipment which is of high quality and also is the highest priced. ■





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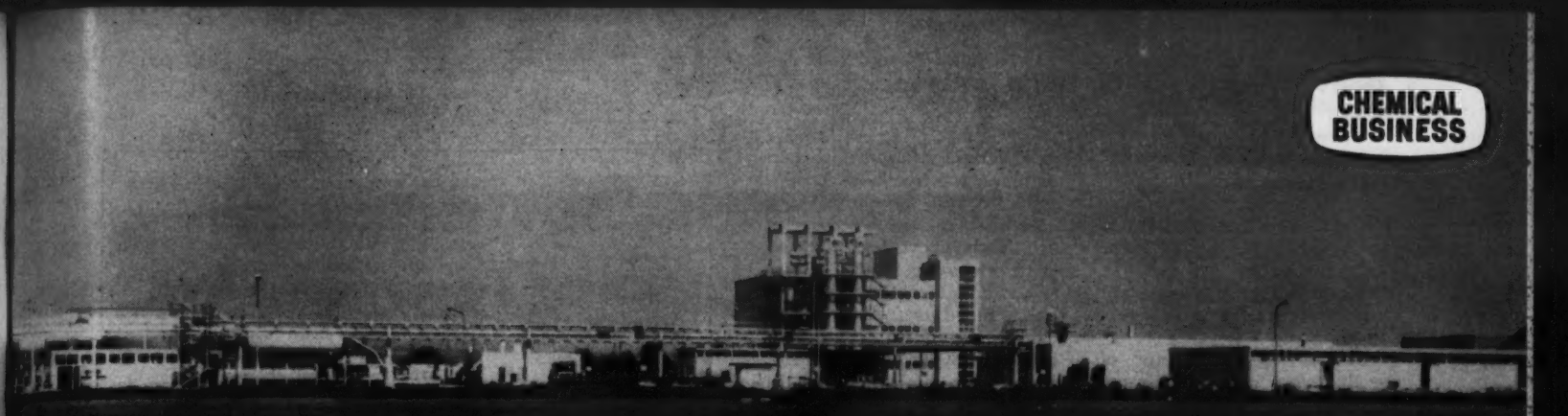

Does it cost less to build overseas?

Synthetic rubber plant of N. V. Chemische Industrie AKV-Goodrich, B. F. Goodrich Chemical affiliate in The Netherlands

By MARVIN W. LARSON
Director of Manufacturing, Engineering and Development
B. F. Goodrich Chemical Company International Department

A New Job for Operating Management

The market research is complete . . . and your company has decided to build overseas. Now you, as a member of the operating management team, step in to implement the decision. What factors must you consider? What unique problems will you encounter?

Here is a concise sum-up by one who speaks from a solid background of experience in "going overseas." It's a guide for those on their first assignment . . . a reminder for the "old-timer."

PRIMARY REASON for establishment of foreign production operations is usually to serve a market in the areas selected. Assuming that a thorough market study has been made and that a definite market exists, it is important to consider the problems involved in building overseas.

The general impression is that labor and material costs are lower and consequently plants can be built at a lower cost and products produced more cheaply.

A look at labor costs in foreign countries, which varies from 30c to $2.00 per hour as compared with building construction costs in the U.S. of $4.00 or higher, gives a false impression. A realistic and penetrating look, as the result of our experience, reveals some interesting data.

To properly evaluate plant costs, one should first be aware that, in the building of a chemical plant in the United States, about 1/3 is labor cost and the balance is materials and equipment.

Is 30c to $2.00 per Hour A Realistic Figure?

In establishing labor costs, there are two factors involved. The first is cost per manhour and the second is productivity.

No matter whether the figure of 30c or $2.00 per hour is used as a basic one, this still is only a direct wage figure. To this must be added substantial charges often much higher than in the U.S., for social benefits, vacation and holiday pay, terminal pay, and many other fringe benefits. These are covered in greater detail later in the article.

Then one must compare productivity. In many cases this can be 20-30% of U.S. performance, or even lower. This is not primarily due to indolence, but it can be caused by differences in available tools and equipment. For example, if one compares productivity accomplished with a wheelbarrow as contrasted to that possible with a bulldozer, obviously there is quite a difference.

In addition to the rather homely comparison of the wheelbarrow versus bulldozer, one must consider the traditional work habits in the country in which the plant is being built. In some underdeveloped countries there is less "pride of workmanship." This results in shoddy work. This is not generally true, however, in such countries as Japan and Germany, which have great pride of "workmanship."

Another factor that must be considered is the number of productive hours worked. Although a typical working day may be established, tardiness, long lunch hours and rest periods contribute to lower production. Generally speaking, the productive hours worked overseas is usually lower than that in the U.S.

In some cases, productivity

Does it cost less to build overseas? *From preceding page*

has been as low as 10% of that achieved in the U.S. True, in a few rare cases productivity slightly exceeds that in the U.S. but it is usually lower and can be as low as 10%. Thus, this is an important factor to consider in an overall analysis.

Considering this factor of productivity, it is not unusual for the labor component of plant cost to equal that in the United States in spite of considerably lower wage scale.

Material, Equipment Costs

Purchase of material and equipment to build overseas is another important consideration.

First is the question of import duties. Whether this be a protective tariff for a local industry or merely a levy imposed on incoming equipment, it can amount to a substantial sum. Most underdeveloped countries and many fully developed ones have substantial protective duties to aid the development of local industry. Even if certain equipment is available locally, prices of this equipment are of course usually the same as, or slightly above the imported price, including duty.

Additional cost which must be included is freight, which can be significantly higher in the case of large equipment. It has been our experience, in some cases, that the ocean freight on a vessel is equal to the original cost of the equipment. Futhermore, insurance and brokers' charges must be added and the delivered cost of imported equipment frequently can be twice that of U.S. costs.

There are times when we are able to secure duty exemptions, in those cases where the equipment is paid for in U.S. dollars, not requiring foreign exchange in the country involved.

Considering the above factors, and assuming the optimistic circumstance that we receive this duty exemption, the relationship of overseas plant cost as compared to U.S. cost can be indicated as shown below. Note that labor cost is calculated as one-half that of the U.S. We have also assumed a "rule-of-thumb" for chemical plant costs as being one-third labor and the balance for material and equipment.

Material	0.67 x	1.10	= 0.737
Labor	0.33 x	.50	= 0.165
Total	1.00	1.60	0.902

or approximately 90% of U.S. cost

Conclusion that might be drawn from the above is that total plant costs should be about 90% of U.S. cost. *But, there are still other factors to be carefully considered.*

Labor Regulations In Many Countries

Labor legislation has been set up to provide the worker with many more fringe benefits and more complex ones than in the U.S. In some instances, the non-wage labor costs can amount to 50% of the total labor cost.

The problems of record keeping alone, required for many of these fringe benefits, results in higher overhead because of the additional workload for the accounting department. Hours and wage laws in most foreign operations generally provide for a maximum work-day and workweek. Provisions for overtime are also regulated. Minimum

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MARVIN W. LARSON, director of manufacturing, engineering and development for BFG Chemical's international department, is responsible for all assistance rendered to BFG Chemical's overseas associate or subsidiary companies in these three areas.

A veteran of 20 years service with B. F. Goodrich, Larson joined the firm following graduation from Michigan State University with a BS in chemical engineering. Shortly afterwards he became shift foreman in the company's Akron, Ohio, synthetic rubber production plant.

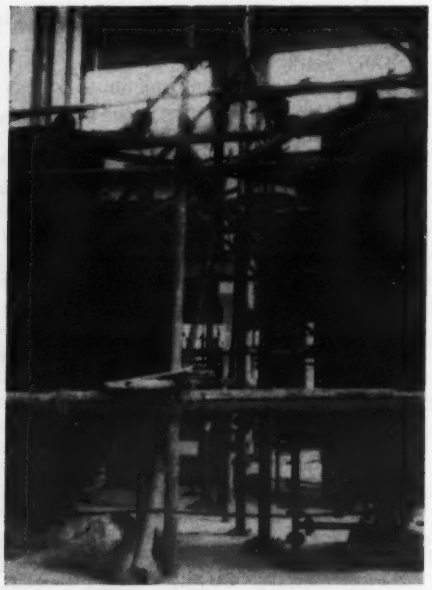
Following supervisory assignments at both Louisville, Kentucky, and at Port Neches, Texas, Larson joined BFG Chemical's engineering department in 1946. In 1951 he was sent to Japan to supervise the design, installation and start-up of a PVC plant for the firm's Japanese associate firm. Returning to the U.S. the following year he supervised design of an acrylonitrile plant at BFG Chemical's Calvert City, Kentucky, facility.

In 1955, he was named manager of project engineering. The following year he joined BFG Chemical's international department as director of associate company relations. He assumed his present position on January 1, 1960.

Don't be too surprised when you see these practices overseas — they're still very evident in some areas

▲ Paradox of the "old and new" — modern lift truck loads an ox-drawn cart

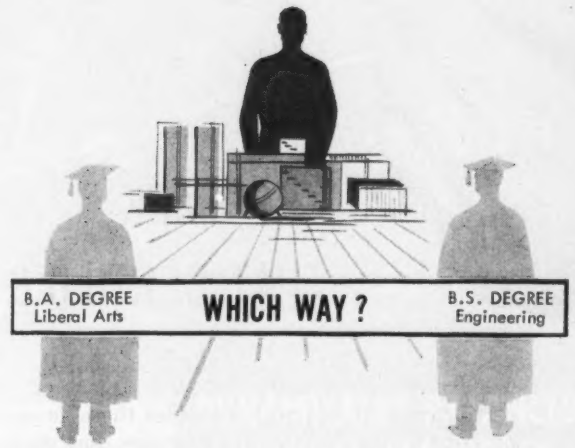
◀ Skids and rollers to provide primitive method of moving chemical tanks



▲ Scaffolding lashed by means of hemp rope — a method brought down through the ages

Will the non-technical-degree man take over as CPI manager?

Although the technical man has an initial advantage, he must broaden himself by acquiring knowledge in the liberal arts, administration and the art of dealing with people if he is to compete with others having well-rounded undergraduate training



By **GORDON WEYERMULLER,** Associate Editor, Chemical Business

"ENGINEERS MAKE POOR MANAGERS!" This statement was made in a paper presented before the Eighth Annual Engineering Management Conference in Chicago in September 1960 by Gerry E. Morse, Vice President, Employee Relations, Minneapolis-Honeywell Regulator Co.

Mr. Morse went on to point out that the idea persists in the minds of many executives that engineers make poor managers, despite the fact that there are many successful engineers in management positions. He stated that the very qualities that make an engineer successful in technical work handicap him as a supervisor or manager.

Although Mr. Morse's opinion is a controversial one, there seems to be little doubt that CPI companies have a problem in finding or developing the well-rounded individuals needed for management positions. If they can't find the right person among technical personnel, they will turn to others with a broad background in administration, business, liberal arts, finance or the social sciences.

Courses and seminars, such as this one held by the American Management Association, help to provide the broader education needed for administration

Of the top seven administrative people in one chemical company doing more than $100 million worth of business per year, only two have technical backgrounds. Four of the others, including the president, have liberal arts degrees. One senior vice president does not have a college degree.

It does seem evident that as an engineer advances in management, he frequently uses his technical knowledge less and less. Instead of dealing with problems concerned with known data and facts, he must make decisions based on differences of opinion among others. He does not always have the assurance of personal knowledge or experience. Frequently, his judgments must be based on a certain amount of intuition.

The engineer or scientist is used to making decisions only after he has the figures and information that direct him to the correct conclusion. As he goes into management, he finds that sometimes he can't wait to make a decision until the studies he feels necessary are completed. His formal training in "logical" thinking may be a serious handicap. He must make correct decisions based on assumptions and faith in the judgment of others.

How does a technical man acquire the knowledge and skills needed for a management position? He may do so in his undergraduate work by taking some liberal arts courses or in extra-curricular activities. While working as a technical employee, he may go to evening school, take management training courses or further educate himself by reading and other activities. His post-graduate liberal education need not be formal. This is shown by the example of men who have reached high industrial positions with their only formal education being grade school.

The point is that, however he does it, the technical man must become well-rounded if he is to meet the requirements of CPI companies for management positions. Let's examine how some chemical companies view the situation.

According to Granger Bierworth, Director of Personnel

To next page

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New CPI Manager? *From preceding page*

Relations, General Aniline & Film Corporation, "The lack of education in the humanities is a major problem in developing technical men for management. It is important that industry continue to recognize it as a problem and do something about it."

Although Mr. Bierworth advocates special management courses and counseling to combat this problem, he believes development is basically an individual's own responsibility. The company will help him any way it can, but he must do the major part himself.

Mr. Bierworth emphasizes the need for helping managers to an appreciation of more effective ways of getting results through people. Important in a technological industry is the ability of managers and scientists to exchange ideas and resolve conflicts in a problem-solving climate that includes mutual respect. A problem-solving approach arrives at better decisions and permits all to have a share in a solution. Too much emphasis on authoritarian decisions, usually arrived at more or less unilaterally, tends to promote a "win-lose" situation, where one man always wins and another necessarily loses. A problem-solving approach avoids this consequence.

Mr. Bierworth thinks we have been fascinated by degrees in recent years without paying enough attention to the basic man. General Aniline has had men with a non-technical degree or no degree at all who have reached high management levels where important technical decisions must be made.

At a major chemical co. plant, not one of the four top management people, from plant manager to superintendent, has a college degree. The technical knowledge so necessary for management in a plant of this type, as well as their liberal education, was acquired by these people all right, but not in the usual formal way.

According to P. B. Lewis, Manager of Personnel at Du Pont, a recent study shows that technically trained graduates constitute about 72% of total graduates in the Company compared to 80% in 1955. Company has 69% technical graduates in management personnel, 17% non-technical graduates and 14% with no degree. For some time Du Pont has employed a number of liberal arts and business graduates each year and many of these are now in management positions.

Mr. Lewis agrees that a technical man must become well-rounded if he is to go into management. However, he does not feel that a technical education is a barrier on the road to management. One can't assume that a technical man stops growing and broadening his education after he enters industry. A liberal arts graduate is certainly not suitable for management right after he graduates.

About 60% of the PhD's at Du Pont come from small liberal arts colleges. The feeling is that some of this is bound to rub off on them even if they stick to scientific courses.

Du Pont has a cross-fertilization plan of shifting employees around frequently to train them for management positions. It does not rely to any extent on formalized management training courses outside the company, particularly if such courses are of long duration. It is interesting to note that Du Pont was selected by 147 other corporations as the best managed corporation in the U.S.

Chemical Company Says Odds Favor Technical Man

The director of personnel at one of the largest chemical companies agrees with Mr. Lewis that technical training is not a handicap for management positions. In fact, he feels that the odds favor the technical man.

Most plant managers at this company have technical degrees. The non-technical-degree man will do better in the home office where less techni-

cal insight is needed.

However, the personnel director points out that the acquisition of the required technical knowledge and broad liberal education do not have to be acquired in a formal way. For example, this company has two or three plant superintendents with no degree at all. The former president of one division started as a day laborer and took courses at night. Another man came up through the ranks without even a high-school diploma and had PhD's working under him.

The personnel director says, "I hope we never come to the day when just a degree opens doors at our company."

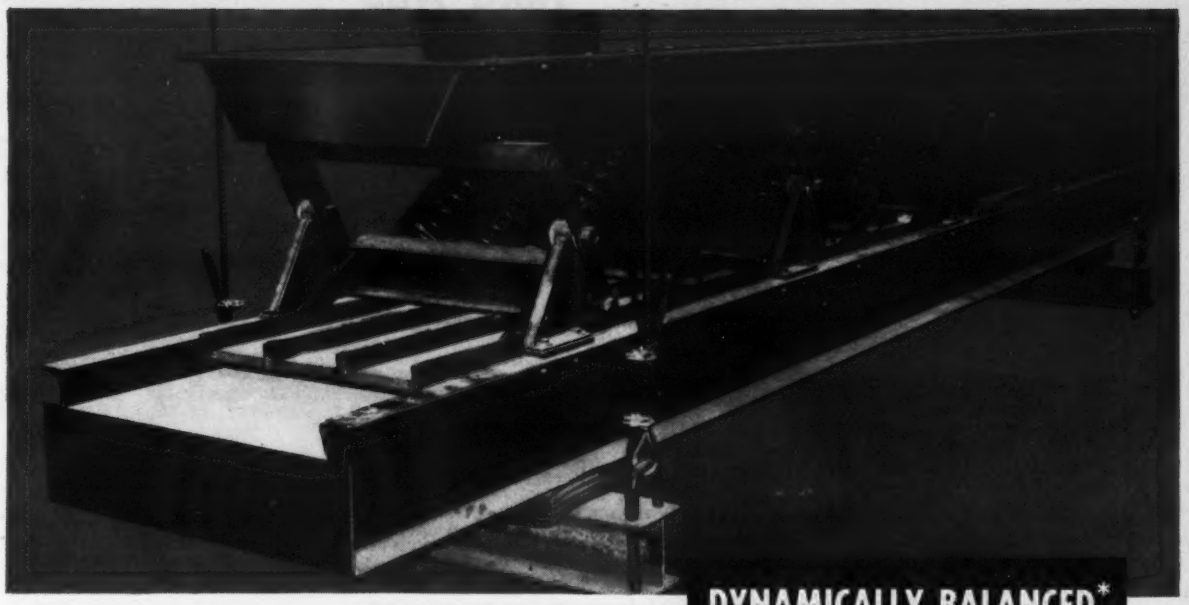
Well-Rounded Individuals Needed for Challenge

Although there is wide disagreement about whether the technical or non-technical-degree man has the inside track for management, and as to whether technical training is a handicap, most everyone agrees that individuals must become well-rounded to meet the management challenge.

There are various ways to acquire this broader knowledge. Colleges are emphasizing it. For example, a recent conference at the University of Michigan recommended that engineering curriculums place more emphasis on humanistic-social studies as well as mathematics and basic science. Hercules Powder has sent many of its managers to the Harvard Business School for three-month courses.

Hence, schools and companies are helping people to acquire the skills needed for management. In the long run, however, it is up to the individual to take the major responsibility himself for broadening his education. If the technical man has an inclination toward management, he should plan a personal program toward gaining this broader, non-technical eduction. If he doesn't do so, he may land on a sandbar, as the management stream passes him by. ■

STEPHENS-ADAMSON



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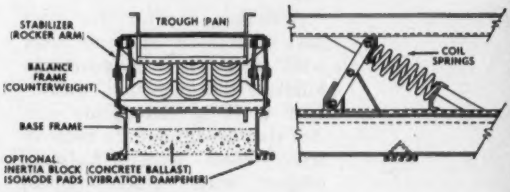

Illustration shows how conveyor trough and balance frame move in opposite directions to prevent most of the vibration from reaching the conveyor frame.

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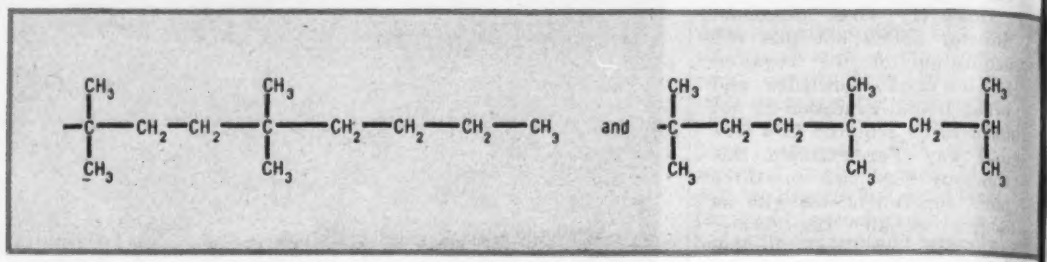
PART II—Synthetic detergents in waste water

'Hard' ABS



Companies search for solution

While chemical methods are being actively pursued for either removing surfactants from water or producing an easily metabolized material — much remains to be done before the cost of conventional ABS and its performance in detergents can be equaled

SYNTHETIC DETERGENTS in waste water is a controversial topic. Some say that a "soft" detergent more easily degraded should be developed. Others say that the answer can be found through improved sewage plants and water-treatment facilities. Both of these areas are being considered in activities underway in a number of companies to find a chemical solution to problem.

Activities are for the most part associated in some way with ABS (alkyl benzene sulfonate), the principal surfactant used in detergents and one that is difficult to remove from waste water. Relative degree with which typical surfactants used in detergents are destroyed is discussed in a recent comment by Hayse H. Black, industrial wastes consultant, Robert A. Taft Engineering Center, Department of Health, Education and Welfare. He says:

"It is known that some surfactants used in detergents break down biologically more readily than others. This group includes those classed as sulfates, esters and amides. The detergents that resist biological degradation include such materials as alkyl phenoxy polyethylene glycols and alkyl benzene sulfonates (ABS)."

ABS, one of the materials difficult to degrade, accounts for 70% of all of the surfactants used in household detergents. Reason it is used so predominantly instead of the more easily metabolized surfactants is because of its performance and economy in majority of detergents.

Among activities concerned with ABS in waste water are its replacement by a more easily degraded type of ABS. Another approach is substitution of an entirely different surfactant that would be more readily removed from water. Also, various procedures are being investigated for removing ABS from water or lessening its effect on sewage treatment.

'Soft' ABS Being Tried In England

Some mention was made in the previous article (March CP, p. 25) of the large-scale experiment being conducted in Great Britain with a "soft" type of ABS. This new ABS, more easily destroyed by the bacteria normally present in sewage plants than is conventional ABS, is being used in detergents distributed in the area surrounding the city of Luton, England.

The "soft" ABS has less branched chains than regular ABS (see formulas). It has been reported that the new ABS was manufactured by Royal Dutch/Shell on the continent. The "soft" ABS is reportedly not available in the U.S.

Lauryl Sulfates Readily Metabolized

Another promising approach is the substitution of lauryl sulfates for all or a portion of the ABS in detergents. Lauryl sulfates are readily degradable and are said to have advantageous detergent properties. L. J. Hodes, assistant director of technical services, Onyx Chemical Corporation, has this to say about them:

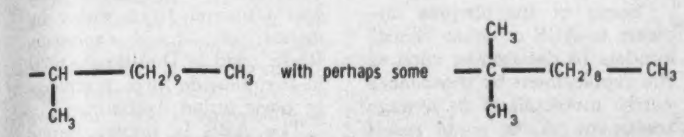
"One encouraging sign is the growing use of lauryl sulfates in household detergents. When used like alkyl aryl sulfonates, lauryl sulfates impart excellent wetting and detersive properties to household detergents. In addition, lauryl sulfates are milder to the hands.

"Cost has been the limiting factor with respect to the more extensive use of lauryl sulfates in household detergent formulations. Within a two-year period, it is expected that this cost differential between lauryl sulfates and alkyl aryl sulfonates will be narrowed. At a lower cost, they will become the principal surfactant used in many detergent products," according to Mr. Hodes.

One event that is expected to make lauryl sulfates more competitive is the Continental Oil Company plant for producing straight-chain fatty alcohols by ethylene polymerization, which is expected to come on stream within the next several months. One of the alcohols produced will be lauryl alcohol (dodecyl alcohol), from which lauryl sulfate is made.

Everyone does not view the

'Soft' ABS



Alkylate of "hard" surfactant for detergents contains such compounds as these. There is no evidence of methylene chains exceeding three carbon atoms in length

Alkylate of "soft" surfactant for detergents contains compounds with such structures as these. There is good evidence of methylene chains exceeding three carbons in length

to detergent wastes

By **GORDON WEYERMULLER,** Associate Editor, Chemical Business

prospects for lauryl or dodecyl alcohol quite as favorably. For example, F. J. Coughlin, associate director, product development division, The Procter & Gamble Company, says:

"It is true, if currently available commercial products are being considered, that a surface-active agent made from dodecyl alcohol is more easily metabolized than a chemically similar material from dodecyl benzene. This is true probably because the alkyl chain in such dodecyl alcohol is a different dodecyl isomer than the alkyl chain in dodecyl benzene.

"Dodecyl alcohol is more expensive than the conventional dodecyl material used in the manufacture of dodecyl benzene. Also, dodecyl alcohol sulfate is more expensive than ABS and from the consumer viewpoint, there are performance disadvantages in dodecyl alcohol sulfates.

"We do not visualize that dodecyl alcohol will make great inroads in replacing the traditional dodecyl benzenes for use in household synthetic detergents or that dodecyl alcohol sulfates will make great inroads in replacing conventional ABS. However, we believe that dodecyl alcohol will continue to be an important raw material for detergents. Its future will depend on the relative costs and performance characteristics of surfactants produced from it."

Another Surfactant On The Horizon

Stepan Chemical Company has in pilot-plant production an easily metabolized surfactant for detergents. Company has not revealed the composition of the material as yet but, upon questioning, indicated that it is not a form of ABS or a product that could be derived from petrochemical alcohol, such as lauryl sulfate. E. J. Black, vice president and general manager of the company's industrial chemicals division has this to say regarding the new product:

"We have, at Stepan, a new surfactant for detergents under development which we find to be equivalent to alkyl benzene sulfonates in cleansing power, but yet is as readily degraded as soap in sewage systems. We believe that in large-scale production this synthetic could approach the alkyl benzene type surfactant in cost.

"Product's lime-soap-dispersing power enables it to disperse and float away soap scums. It can be used to advantage in combination soap-synthetic bars and, even possibly, in soap-synthetic washing-machine compounds. Material furnishes a somewhat more fragile foam than ABS, which would tend to improve washing-machine operation," according to Mr. Black.

Additional research being done to develop a more easily metabolized surfactant is discussed by a spokesman for one of the major chemical companies. Here are his comments:

"We are aware of the long-range problem of excessive detergent concentrations in sewage. We recognize it as a serious problem in the years to come and are looking at many of our detergent and sewage-oriented research projects in the light of this problem.

"Straight-chain alkylates or straight-chain hydrocarbons are susceptible to biological attack. As a result, some of the industrial research is aimed at developing an economical source for a controlled-length, straight-chain hydrocarbon, suitable either for alkylation of benzene or for reaction with water-soluble chemical radicals that will make the hydrocarbon surface active.

"Several of the petroleum companies are looking at cracking of waxes which gives alpha olefins suitable as surfactant intermediates. It is suspected that these materials may be economical enough to compete with alkyl benzene sulfonate and be biologically susceptible."

A method for manufacturing straight-chain olefins, from which "soft" surfactants for detergents can be derived, is reported by Dr. Robert W. Cairns, director of research, Hercules Powder Company, who says: "Such straight-chain olefins can be prepared by the process of Professor Ziegler (*Angew. Chem.* 72, 829-835, 1960), based on aluminum alkyls. Triethyl aluminum and other alkyls are made by Texas Alkyls, Inc., jointly owned by Hercules and Stauffer. Research and development on the Ziegler olefin process is being conducted and favorable indications of its commercial practicability have been shown."

Degradable Detergents Could Cause New Problems

It is possible that the use of a "soft" surfactant could create difficulties of another type. This is pointed out by Chris G. Schulze, general

To next page

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Check 3251 opposite last page.

Detergents *From preceding page*

manager, Antara Chemicals Division, General Aniline & Film Corporation. He says:

"Some of the obvious answers to ABS or other "hard" syndets in detergents, such as the replacement by those more easily metabolized in sewage treatment plants, could result in new problems. If large quantities of these readily degradable detergents entered rivers or lakes without being treated to remove surfactants, a serious increase in BOD might be the result. This, of course, would be a step in the wrong direction as far as the results the law-enforcement bodies concerned with water purity are trying to attain.

"Our company will continue to take an active technical interest in this problem and will consider the biodegradation of detergents one of the major problems to be studied in the development of syndets from new hydrophobes."

Projects Undertaken For Removal Of ABS

Instead of developing a new type of ABS or replacing it with other surfactants more easily metabolized, some research is being conducted toward developing practical methods for removing the type of ABS used now from waste water. The Association of American Soap and Glycerine Producers has sponsored projects of this type.

One of the projects at the University of California reports on 84% removal of ABS by frothing techniques. However, problem remains of disposing of froth without increasing costs unduly.

In another AASGP project at John Hopkins University, activated carbon was found to be the most practical adsorbent among a number studied. Once again, however, use of this procedure would add considerably to the cost of treating water or sewage.

In another project* conducted by the Chemical Process Company of Redwood City, California, 99% of ABS was removed from water by means of anion exchange. Resin used is Duolite A-102D in the chloride form, a strongly basic anion exchanger.

The ABS is tightly bound to the resin after adsorption, but can be eluted with a combination of mineral acid and a polar solvent.

Cost for this ion exchange procedure without regeneration, based on an influent containing 2 ppm ABS, would be 5.4¢ for resin replacement per 1000 gallons of water or sewage treated. With throughputs of one million gallons per cubic foot per cycle, regeneration with methanol or acetone and acid could be considered. Regenerant cost is estimated at ½¢ per 1000 gallons of water treated. If solvent regeneration were practical, recovery of both solvent and ABS could be attempted for further economy.

Several firms are currently evaluating the potential of this ion exchange method for removing ABS.

Treatment Practices Are Important

A check in the Chicago area shows that the foam associated with ABS certainly can be lessened if specific measures are taken by sewage plants or water-treatment plants. For example, several sewage plants near Chicago have decreased the foam problem through use of water sprays. Others have found the foam problem largely resolved when a new and more modern sewage-treatment plant was built.

Along this line, T. G. Hughes, president, Oronite Division, California Chemical Company, says, "To my knowledge, there has been no real problem with ABS in this country where good sewage- and water-treating practices are followed. The situation may be different in some foreign countries where sewage-treating plants are inadequate.

"Our company does include

*Footnote — Technical paper, "Removal of Alkyl Benzene Sulfonate from Water by Chloride Cycle Anion Exchange," was presented at the September 1960 meeting of the American Chemical Society in New York City. It was prepared by Dr. Irving M. Abrams and Sidney M. Lewon of the Chemical Process Company.

biological degradation studies as one of the many phases of research on new and established products. At present, we cannot predict what the outcome will be on this particular work. It is an exceedingly complex field and one in which little is known about the significance of laboratory results under practical conditions. I personally believe that, all factors considered, ABS will remain as a major synthetic detergent product for a great many years."

Others view the subject of synthetic detergents in waste water as one of increasing future concern in the U. S. R. M. Thomas, director of industrial chemicals application research department, Olin Mathieson Chemical Corporation, says:

Problem Will Grow

"We are aware of the problem that ABS in sewage water presents. We continuously evaluate new surfactants as possible solutions to this problem. It is our feeling that this problem will become more acute over the years as our population increases and our water supply becomes more critical. Whether consumers are prepared to pay a premium for such a product on their own initiative at this stage is very questionable. Legal action by one of the states could, of course, affect this situation drastically."

In summary, the question of ABS in waste water remains a controversial one. As has been the case with many other things, the chemical industry is trying to find answers by a variety of different methods. The company that finds the answer will stand to gain both economically and in stature. ■

Chemical Industry is reviewed with respect to current trends and outlook for the future in eight-page booklet. Information on a number of chemical companies and their prospects for the years ahead is given in "The Outlook for the Chemical Industry"—Harris, Upham & Co.

Check 3252 opposite last page.

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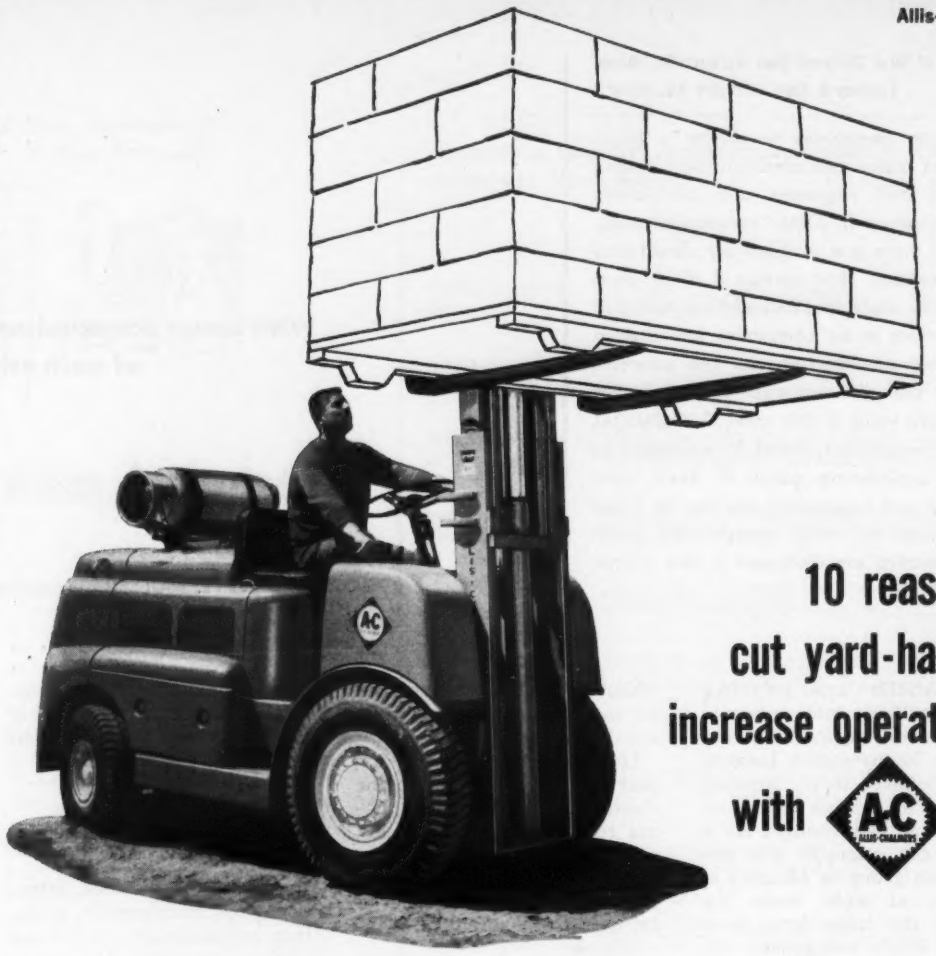

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CHEMICAL BUSINESS

Must We Orient the Scientific Mind Toward the 'Profit Motive'?

Some companies recognize a problem of unrest and dissatisfaction among scientists and engineers and are taking steps to alleviate it. Other companies might say there is a problem but doubt that it is serious. How serious it it? A comprehensive study of 622 technical men and 105 executives in six companies indicated a basic conflict between the scientific mind and the management mind. But how valid is this survey? CHEMICAL PROCESSING magazine quizzed 25 managers of research or engineering about it. Their comments on it and suggestions on how to orient the scientific mind toward the profit motive are discussed in this article.

With better communications and recognition of each other's contributions—

Technical men and managers

By **GORDON WEYERMULLER,** Associate Editor, Chemical Business

COMPANIES are pouring added millions into research, development, engineering and process improvement because they believe their survival depends to a large extent on innovation and change. *As a result, the scientific and engineering group in industry is growing at eight times the rate of the labor force as a whole.* While recognizing the vital importance of technical employees, top officers of some companies are puzzled by the unrest and dissatisfaction among this group.

Some companies are aware that there is a wide gap between the thinking of these technical employees and that of management. Other companies question if a serious conflict exists between these two groups. All, however, recognize that maintaining a high morale in the technical group is important to the success of the company.

In order to determine if such a conflict does exist, how serious it is, the nature of it and to develop suggestions for solving the problem, Opinion Research Corporation of Princeton, New Jersey, some time ago conducted an extensive study. A total of 622 scientists and engineers and 105 managers* from six scientifically minded companies were questioned. They met in groups and completed self-administered questionnaires. About 1½ hr. was required for each group to complete its questionnaires.

Of the six companies taking part in study, four are in the chemical processing field, being respectively in chemicals, drugs, petroleum and rubber. One of the other companies is in aircraft and the other is an electrical equipment manufacturer.

The study showed that 75% of the technical men surveyed believed that there is a conflict between a man's personal goals, which are largely focused on his work, and those of his company, which are concerned with the entire operations of the company. Some 26% viewed this conflict as serious. On the other hand, the survey showed that 55% of the managers believed a conflict of some kind exists, but only 5% considered it as serious.

It is of interest that of the six companies studied, the one with the highest proportion of high-paid, well-educated professionals had the most unrest. (This indicates that money alone is not a complete solution to the problem.) Some 40% of this group believed that a serious conflict in goals existed at this company. The serious nature of this conflict was recognized by 18% of the managers.

*With reference to both the survey and those comments reported later in this article, technical men were considered to be those whose primary duties are technical and who do only a minimum of supervisory work. Managers were considered to be in the group ranging from department heads to executive officers.

Engineers and Scientists Disgruntled, Says Study

Despite considerable attention from management, scientists and engineers remain one of the most dissatisfied groups on industry's payrolls, according to Opinion Research. With respect to general morale, engineers and scientists scored consistently below management, salesmen, accountants, foremen and other white-collar groups.

The study indicated that 71% of the 622 technical men thought that companies force engineers and scientists to over-specialize. Some 72% considered that management misuses engineering and scientific talent. It was believed by 80% that experienced scientists and engineers are underpaid compared to other groups.

On the other hand, the study showed that it is not just salaries, benefits and working conditions that make up the problem. Major cause is a fundamental conflict of interest between the management mind and the scientific mind. Engineers and scientists have a desire for status and freedom that is hard to meet in a corporation. Managers also desire freedom and status but, due to their position, can attain these goals more easily. A lack of mutual respect for the methods and contributions of each group exists in the minds of managers and technical men.

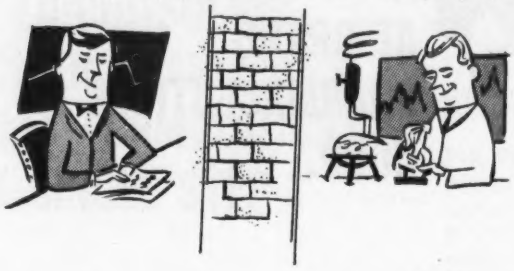
About 82% of the scientists and engineers believed that they are mainly responsible for our high standard of living. Some 67% thought that getting ahead in management is based more on politics than it is on knowledge.

Fundamental conflict is well illustrated by a number of contrasting qualities engineers attributed to themselves and to management. For example, 78% of the technical group considered that they study problems intensely while only 5% think management does this. Some 60% of the technical men believed that their group is interested in new knowledge while only 22% attributed this quality to management.

Only 1% of the scientists and engineers thought they measure results in dollars while 89% believed that management thinks in these terms, according to study. Only 2% considered that they "manipulate" people for their own purposes, while 64% believed management does this.

In order to check the validity of the Opinion Research

How Thick Is The Wall Between Management and The Technical Man in Your Company?



can move closer together

study and obtain suggestions on how the problem (if it does exist) might be alleviated, CHEMICAL PROCESSING showed the study to about 25 managers of research and engineering functions at chemical companies and questioned them about it.

The majority of the managers questioned felt that the results shown in the Opinion Research study are valid. For example, the manager of engineering and construction of one of the major chemical companies says: "I have read the conclusions and opinions of the research study and feel that the results they came up with are valid and would be much the same if our company had been used in the survey."

It is of interest that the American Institute of Chemical Engineers discovered a degree of unrest when a portion of its membership was surveyed recently. Most of this seemed to have to do with lack of recognition of the dignity of the individual and his status as a professional, according to J. J. Healy, AIChE vice president.

Although the vast majority of the people who have looked into it agree that there is a conflict between the scientific mind and the management mind, opinions differ on the seriousness of it. About 50% of the 25 managers questioned thought the problem was not serious or that the gap in thinking between technical men and managers was not as wide in their own companies as was suggested in the study.

P. M. Lindstedt, manager of chemical engineering, The Goodyear Tire & Rubber Company (reported by Mr. Lindstedt to be one of the six companies taking part in the Opinion Research study) wonders if the conflict may not be advantageous in some ways.

He says, "Perhaps it is logical to have a conflict between the personal objectives of the individual and those of management and the corporation, so as to insure the essential growth and welfare of our free enterprise system . . . I cannot imagine that a survey of a technical group employed by a corporation will ever reveal complete satisfaction with the status quo since these professional men were trained to achieve something better."

Suggestions On How To Improve Relationships

Mr. Lindstedt, however, does feel it would be desirable to improve the relationship between technical and management personnel and says he believes that Goodyear has made substantial progress in this area through regular meetings participated in by both groups, at which project status, alternate methods and economic considerations are discussed in detail.

Mr. Lindstedt believes these meetings improve morale, but thinks there are some things a technical employee must do for himself to gain in stature. For example he says: "Enthusiastic presentation of technical ideas and accomplishments is as important to the individual's chance for recognition as technical ability alone."

Mr. Lindstedt and practically all of the other 25 managers suggested better communications as the way to bring the goals of an individual closer to those of a corporation.

For example, L. J. Sitomer, chief engineer, Neville Chemical Company, says: "The gap in thinking between technical employees and management is wide only because of the lack of communications. In many cases management reaches a decision and does not explain why it has done so. The lower a person is in the organization, the less he learns about these decisions."

Another typical comment on the lack of adequate com-

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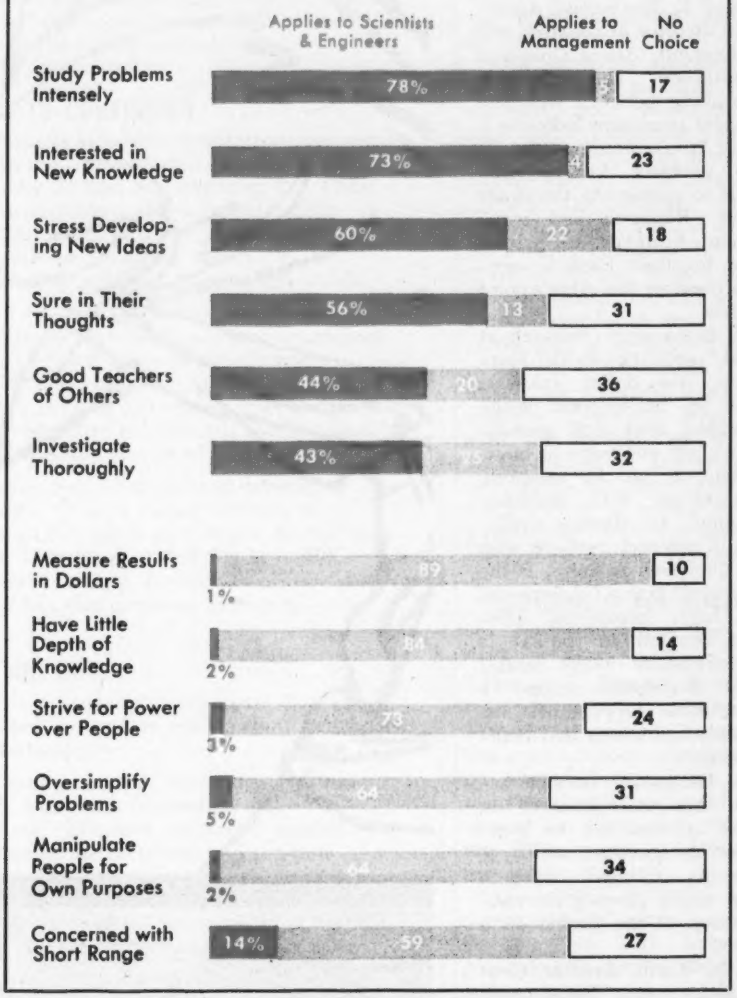
Contrasting Qualities Engineers and Scientists Attribute to Themselves and Management . . . (Opinion Research Study)



Tech Men & Managers

From preceding page

munications is that of Dr. Howard E. Hurmence, assistant to director of research and development, Allied Chemical Corporation: "The difference in thinking between technical men and managers indicates a failure in communications. It is a problem for research people to appreciate the profit motive. Research and management, however, are getting closer together. Each is coming around to the other's point of view.

"In exploratory research at Allied," according to Dr. Hurmence, "the dollar value is far in the background. When something does look promising, we get everyone in management in on the research. In meetings with technical personnel, we discuss evaluation of research projects with such questions as these: Is the idea novel? Has a fundamental need been considered? How about competitive routes? Is it scientifically worth while? These discussions create a much better rapport between the technical group and management."

Dr. Hurmence doesn't believe that consideration of profits is confined to companies. He mentions one large university-affiliated research group which gives great consideration to the profits on a project.

W. H. Kordt, director, Central Engineering Department, Atlas Powder Company, is one of several favoring profitsharing or bonus plans to make technical employees more aware of the profit motive. He says:

"It is my belief that nothing can surpass the almighty dollar as an incentive for men to treat company funds like they would their own. Even though employees are not stockholders, it is not too much of a chore for management to keep their men posted on earnings in a language which is understandable to the average man. If profitsharing plans are in practice, obviously the problem of keeping

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P-K PRE-TEST RESULTS CONFIRMED

Before installation, specially selected formulations prepared by Ortho were tested in the Liquid-Solids Blender at the P-K Pre-Test Laboratory in East Stroudsburg, Pa. These results then formed the basis for more extensive testing of the blender at the Ortho Plant. Here, tests centered mainly around the precision blending of dry materials and uniform dispersion of liquids and solids.

In a dry blending test, research engineers put 0.5 gms. of activated charcoal powder into 29 lbs. of Ferrous Calcium Citrate-with-lubricant mixture, through the charge openings of the P-K Blender. Following ten (10) minutes of operation, one-pound samples were taken from each of the three openings and subjected to microscopic examination. *Counts showed total dispersion had been achieved.*

In a similar liquid-solids test, 50 pounds of powdered lactose were pre-blended. Then, a dilute solution of methyl violet (0.1 gm./1,000 gm.), in 300 gm. increments, were poured in. After blender operated for ten (10) minutes, the powder was removed. *Inspection showed a more homogeneous wetting than that achieved in tests of other equipment.*

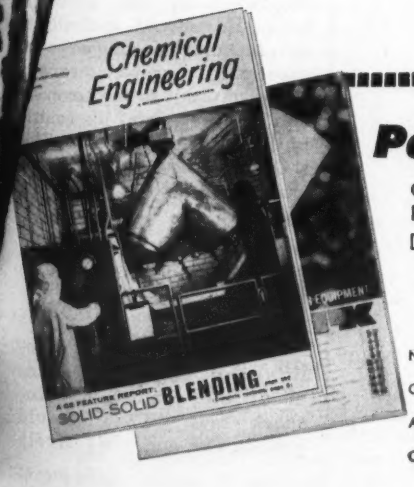
PRE-TEST BEFORE YOU BUY

Considering new solids processing equipment? You can justify investment—dispel or confirm doubts about purchase—at the P-K Pre-Test Laboratory.

Here, an unmatched range of solids processing equipment is available for testing: standard, intensifier, and liquid-solids "Twin-Shell" blenders, packaged tumble dryers; ribbon and doublecone blenders; and the new Solids-Processor* which telescopes up to ten operations in one unit. This equipment, plus the experience of engineers who have run thousands of resultful pre-tests can point the way to product improvement and process modernization.

Why not investigate? There's no cost or obligation. Write or dial George Sweitzer in Stroudsburg at HAmilton 1-7500 to discuss a pre-test date.

*patented



Patterson Kelley Chemical and Process Equipment Division
134 Burson Street, East Stroudsburg, Pa.

Gentlemen:
Please send me your (check one or both)—

☐ NEW REPORT ON SOLID-SOLID BLENDING. A 23-page cover article from *Chemical Engineering*, Aug. 8, 1960. Discusses blending theory, practice, equipment and economics.

☐ NEW P-K PROCESS EQUIPMENT CATALOG NO. 16-P. A 20-page bulletin, covers P-K pre-test services, lab and production blenders, vacuum tumble dryers, packaged resin-distillation pilot plants, heat exchangers.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

specialists advised as to the progress of the company is simplified."

Mr. Kordt also suggests the following practice on engineering projects as one that will create a better feeling. He says:

"One workable approach is for a manager to insist that his men make recommendations for a particular course of action. Since most projects involve various types of engineering, the average individual may be reluctant to do more than comment on his phase of the job. With a little encouragement, he will make a recommendation for action on the part of the project with which he is concerned. This should be accepted if at all possible. This will give the man the feeling that he is being backed in his recommendations. In many cases he is more likely to be in a better position to reach the correct conclusions than his manager."

Cooperation Of Both Groups Needed To Narrow Gap

Donald G. Sturges, director, research and development, The Carborundum Company, has some excellent suggestions on what both managers and technical employees can do to narrow the gap in their thinking. With respect to management, he says:

"One useful device is frequent informal conferences of the manager with technical personnel to discuss technical and administrative problems. The opinion and aid of technical people can be enlisted for the handling of both of these kinds of problems. These conferences will help both groups to better understand each other's point of view. This is one way to create an atmosphere which makes it clear that the ideas of technical personnel are welcome.

"Management should establish two equivalent ladders for the advancement of technical personnel — an administrative and a technical one. Managers must learn how to work with scientists and engineers, not just supervise and control them. Administrative red tape

should be kept to a minimum.

With respect to gaining better acceptance for company goals, Mr. Sturges says, "One of the best ways of orienting technical employees toward the profit motive is through incentive programs. One method is participation in an incentive program based on the profits of the company. Another is individual awards based on specific personal contributions. A third is payment for published articles."

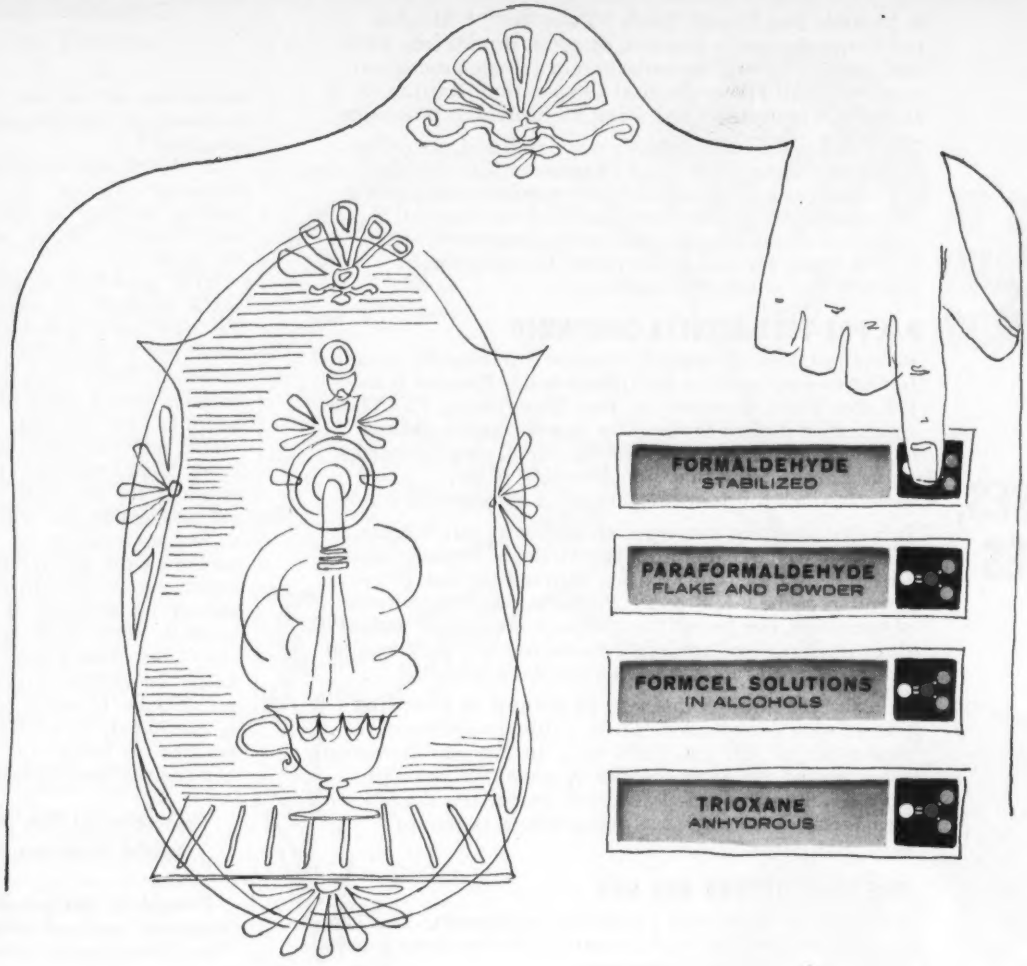
Mr. Sturges believes that an individual technical employee should reorient his thinking as follows: "He should be flexible in the type of problems he feels competent to work on. He should be willing to engage in new fields of investigation. He should be willing to admit to himself when a project has reached a point of no return and then look for other important problems to solve. He should realize that the future of the company depends on ideas which are generated by technical personnel and which flow from the bottom to the top of the organization. He should not expect that ideas always come from the top of the organization down."

Samuel Loshaek, director of product development, The Borden Chemical Company, suggests the following steps to improve the situation: "A manager should keep technical employees informed as to what decisions are being made and why they are being made. He should praise technical employees for good performance. He should indicate to the technical employee what success in a project means in terms of profit to the company and how important his contribution is considered. This should not be done with generalization but with facts and figures."

Scientists Should Appraise Position In Industry

With respect to what scientists and engineers can do about the conflict, Mr. Loshaek says, "They should realistically and objectively

To page 81



What's your cup of tea?

No matter how you use Formaldehyde there's a Celanese type to meet your needs

From stabilized formalin, with low temperature tolerance fully 20 degrees below ordinary standards, to water-free trioxane, Celanese can meet your formaldehyde specifications right on the button! Our formaldehyde production capacity is one of the world's largest. Our formaldehyde research and experience are among the best. Celanese Chemical Company, 180 Madison Avenue, New York 16. Celanese® Formcel®

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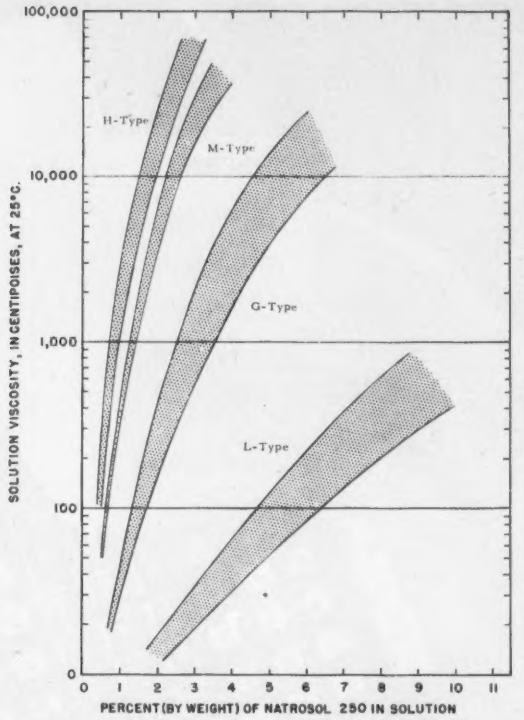
Celanese CHEMICALS

Check 3254 opposite last page.

Hydroxyethyl cellulose proves highly efficient in water-based coatings

High viscosity permits less thickener to be used and reduces concentration of water-sensitive colloid to improve water resistance



Shaded bands show viscosities using four types of Natrosol. Viscosities determined at 25°C with Brookfield viscometer

PRODUCT IS USEFUL as a thickener and protective colloid in water-based paints of either the emulsion or dry powder type. Known as Natrosol 250, it is compatible with polyvinyl acetate, styrene-butadiene, acrylic and alkyd emulsions.

Because of the thickener's high viscosity (greater than 25,000 cps at 2% concentration in water), paints may be prepared with 25-30% less thickener than with thickeners of 4000-cps viscosity. This not only results in lower thickener cost, but also serves to reduce the concentration of water-sensitive colloid present in the paint. Paints thus thickened frequently show improved water resistance.

Material is a white, free-flowing granular powder readily soluble in either hot or cold water. Resulting solutions are clear, smooth, viscose, and they are nonionic in nature.

Four different types are produced — designated H, M, G and L to fit uses as a thickener, protective colloid, binder and film-former. Higher-viscosity types, H and M, are generally used in paint manufacture because of greater thickening efficiency. Lower-viscosity types, G and L, are used as protective colloids in emulsion polymerization where large viscosity increases are not desirable.

Paints thickened with the product show full color development at elevated mill temperatures even with phthalocyanine blues and greens.

Since the polymer is nonionic its solutions show outstanding tolerance to high concentrations of dissolved salts and changes in pH. Solutions undergo little viscosity change over a pH range of 2.5 to 10.5.

Solution viscosities decrease consistently with increases in temperature and do not gel at the boiling point. As a result, paints thickened with the material show good shelf stability at elevated temperatures.

In general, the use of from 2.5 to 4.5 lb of Natrosol 250 H per 100 gal of paint is required to give proper consistency and stabilization. Since there are many variables involved in water-based paint systems, each formulation must be considered a separate problem.

Typical paint formulations, recommended by major producers of emulsion vehicles, are included in the technical data available from maker.

(Natrosol is a product of the Hercules Powder Company, Wilmington, Delaware)

Check 3546 opposite last page.

PRODUCT SPECIFICATIONS

Viscosity of Water Solutions

Viscosity Type	Brookfield Viscosity at 25° C at Varying Concentrations (cps) 1%	2%	5%
H	1500-2500	25,000	—
M	—	4500-6500	—
G	—	150-400	—
L	—	—	75-150

All viscosity types conform to the following additional specifications:	
Ash (calculated at Na_2SO_4), %	4 max.
pH (2% solution)	6.5-8.5
Color	white to slight tan
Moisture (as shipped), %	5 max.
Particle size:	
Passing U. S. #40 mesh, %	90 min
Bulk density, g/ml	0.55-0.75

Typical properties of Natrosol are:	
Refractive index at 25°C (2% in water solution)	1.336
Specific gravity at 25/25°C (2% in water solution)	1.0033
Specific gravity at 25/25°C (solid)	1.45-1.60
Bulking value, gal/lb (2% in water solution)	0.12

CALCULATING LOWEST COST TO YOU... A ROHM & HAAS ACRYLIC MONOMER SERVICE

By analyzing carrier rates and providing detailed delivered cost data on various combination purchases, both bulk and drum, Rohm & Haas can help you plan lowest-cost purchasing of acrylic monomers.

For example, your Rohm & Haas representative could arrange shipment of two or three monomers in a compartmented tankcar or tanktruck and you would benefit by getting the bulk price on each product. Of if you buy in drums, you might purchase a mixed truckload or carload of drummed materials at carload drum prices.

Because Rohm & Haas manufactures a wide variety of both acrylate and methacrylate monomers and emulsion polymerization auxiliaries, the opportunity to save through mixed shipments is very often an important purchasing advantage. Additional advantages are: monomer plants in convenient locations for short-distance shipping to most major industrial areas in the U.S.; convenience of one-source purchasing.

Full technical assistance in planning facilities for storing and handling monomers is yours when you choose Rohm & Haas as your supplier.

Request literature and samples from Dept. SP-4

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Rohm & Haas Acrylic Monomers

Methyl Acrylate • Ethyl Acrylate • Butyl Acrylate • 2-Ethylhexyl Acrylate • Methyl Methacrylate Ethyl Methacrylate • Butyl Methacrylate • Hexyl Methacrylate • Decyl-octyl Methacrylate Lauryl Methacrylate • Stearyl Methacrylate • Glacial Acrylic Acid • Glacial Methacrylic Acid.

Check 3255 opposite last page.

Emulsifiable hard waxes priced comparable to oxidized petroleums

Uses: Manufacturer predicts largest potential for waxes in polymer floor-finish field to supplement the properties of emulsifiable polyethylene. Additional markets are seen in field of textile softeners.

Features: Snow-White, ash-free, emulsifiable hardwaxes are available at a price comparable to ordinary oxidized petroleum wax or emulsifiable polyethylene. In floor-finish applications, they will improve wear-resistance, heel-mark resistance and ease of processing without degrading the wanted light color and slip resistance. In textile field, they should contribute better non-soiling properties and reduced thread breakage in white cotton "wash-and-wear" fabrics.

Description: Oxygenated hydrocarbon waxes are currently available in three grades: Efton U, acid value 20-25; Efton UC, acid value 25-30; Efton R, acid value 30-35. These are in commercial production and offered at a uniform price of $0.35/lb in truckload quantities. For minimum 1000-lb quantities price is $0.37/lb.

(Efton waxes are a product of Dura Commodities Corp., 20 Vesey St., New York 7, N. Y.)

Check 3256 opposite last page.

"Plant manager? My analysis shows a small amount of chemical in our rust process!"

Polyester resin produces low-durometer urethanes

Table 1

Typical Analysis of Formrez

	No 112-R	No 131
Hydroxyl No	61	412
Acid No	1.9	1.5
Water Content	0.03%	0.1%
Color (Gardner)	1	1-2
Viscosity at 25°C	15,000 cps	165,000 cps
Specific Gravity at 25°C	1.186	1.15
Weight Per Gallon at 25°C	9.8 lbs	9.6 lbs

Uses: Resin is used in the production of low durometer solid cast urethane elastomers. Printer rolls, potting and encapsulating compounds are some of the specific applications for the material.

When compounded for printer's rolls, its soft composition permits operation at high temperature and high speed. Long life of the roll results since it is resistant to the high humidity under operating conditions.

Features: A system based on the resin and a diisocyanate exhibits excellent processing characteristics.

Description: Product is a diethylene glycol adipate type polyester resin and known as Formrez #112-R. Typical analysis shown in Table 1.

Handling Procedure: Here is a typical procedure to be followed for the preparation of solid cast urethanes under laboratory conditions.

1. Dehydrate the resin for one-half to one hour at 130°C with moderate agitation under reduced pressure of 5 to 15 mm hg. For pressures greater than this, dry resin for a longer period of time under vacuum, from 2 to 4 hrs at 130°C under reduced pressure of 50 to 75 mm hg. To produce bubble-free castings, it is important that the resin be anhydrous and degassed. This is accomplished by heating under vacuum to remove all traces of moisture and entrapped air.

2. Cool the resin to 100°C and continue agitation.

3. Stop agitation, release vacuum (air admitted should be dried by allowing to pass through a drying tube) and add toluene diisocyanate (80% 2,4 isomer) (20% 2,6 isomer). Add slowly until the mixture is homogenous (5-10 min), maintaining an approximate 100°C temp. Material has a pot life of approximately 30 min at 130°C.

4. Cast mixture into a suitable mold and cure for approximately 4 hours at 145°C. For easy removal of castings from the mold after cure, mold should be treated with release agent, such as carnauba wax or a silicone. Casts prepared in aluminum foil molds strip readily without the use of release agents.

Typical physical properties of a solid cast urethane with a 17 Shore A durometer:

Tensile strength, psi .. 220
Elongation, % 600

Above procedure will differ somewhat for commercial manufacturing since conditions will vary according to batch size, and the design and efficiency of the equipment. Generally, the laboratory procedure can be followed with slight modifications relative to processing times indicated. For example, at 130°C under a vacuum of 5 to 15 mm hg, it is usually preferable for preliminary batches to dehydrate for 1 to 2 hrs until it has been determined that the time can be reduced.

Hardness of the solid cast urethane is dependent upon the amount of toluene diisocyanate incorporated into the resin. This is illustrated in Table 2. It is not unusual to have a range of plus or minus 5 in durometer hardness from those shown in the Table. Variation is due to temperatures of raw materials, temperatures and mixing conditions used in preparation, and curing temperature.

When Formrez #112-R is compounded with other resins, it can be cast and molded in a range of 20 to 85 durometer. The nature of the resin is such that reproduceable results are secured from batch to batch.

Hardness of the finished cast can be increased by the use of a polyester resin (Formrez #131) as a blending agent. Analysis of the resin is shown in Table 1.

(Formez #112-R and Formrez #131 are products of Witco Chemical Company, Inc., 122 E. 42nd St., New York 17, New York.)

Table 2

Parts TDI (80/20) Per 100 Parts of Formrez No 112-R	Approximate Durometer Hardness — Shore A
6.5	8.0
7.0	12.0
7.5	18.0
8.0	25.0
8.5	32.0
9.0	40.0
9.5	45.0

Check 3745 opposite last page.

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Please rush a FREE SAMPLE of a Dow Corning silicone defoamer for my product or process, which is (indicate if food, aqueous, oil or other): _____

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POSITION _____

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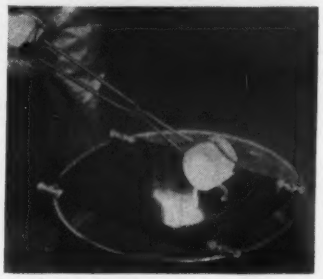
Check 3257 opposite last page.



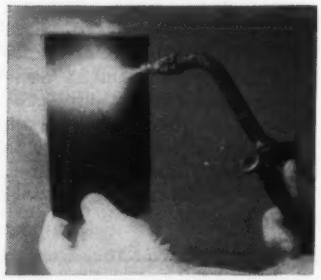
A one-pound slug of molten steel, heated to 3000°F, is poured onto fabric of heat-resistant fiber. This slug solidified on the fabric without burning through it

Heat-resistant fiber retains flexibility and part strength

Fiber takes 10,000° Kelvin without melting

This all-organic, heat-resistant fiber retain its flexibility and part of its strength after exposure to intense heat. It has been exposed in a plasma jet to temperatures up to 10,000° Kelvin without melting. Fiber is entirely free of elemental carbon and conducts very little heat or electricity. It does not char or melt.

Although primary applications will be in rocket and missile field, material should find application in light weight



Fiber reinforced with phenolic resin withstands 5000°F without making it necessary for the man to withdraw his fingers, just three inches from the "hot spot"

fire-protective curtains and in laminate form for temperature-resistant structural parts.

(Pluton brand heat-resistant fiber is a product of Minnesota Mining & Manufacturing Co., 900 Bush St., St. Paul 6, Minn.)

Check 3258 opposite last page.

Enzyme retains activity, hydrolyzes cellulosics under varied conditions

Possesses excellent stability

Uses: Enzyme quickly and efficiently digests paper, cotton, wood, soybean hulls, barley gums, carboxymethyl cellulose and other cellulosic materials.

Features: Recently developed cellulase enzyme possesses excellent stability and activity under a wide range of conditions. It hydrolyzes and thus depolymerizes cellulosics. Previously available materials have evidenced marked inability for concerted activity. Tests have shown that the enzyme can be effectively used under conditions of low pH or where changing levels of acidity occur. At a pH of 8.0, more than one-third of the optimum activity is still exhibited.

Description: Material, Takamine Cellulase 4000, is commercially available with standardized 4000 cellulase units per gram. It is also available commercially up to levels having three times this standard potency. Solutions of the enzyme at its natural pH of 5.0 are indefinitely stable at room temperatures and up to 100°F or even higher.

(Takamine Cellulase 4000 is a product of Miles Chemical Company, Div. of Miles Laboratory, Inc., Elkhart, Ind.)

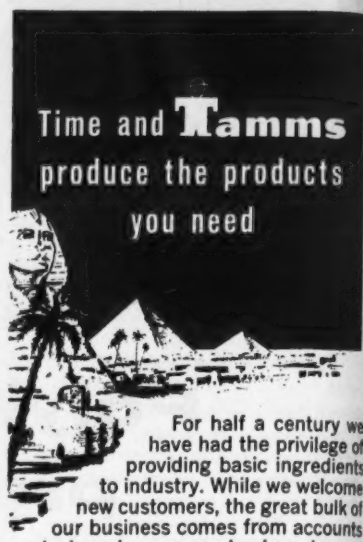
Check 3259 opposite last page.

Anionic family added to company's line of surface actives

Uses: The application areas predicted for these anionic surface active agents include textiles, heavy-duty liquid detergent cleaning compounds, emulsion polymerization and pesticide emulsifiers.

Features: Products are excellent emulsifiers and detergents that may be prepared with varying degrees of solubility in aromatic, aliphatic and chlorinated solvents as well as water and strong aqueous solutions of alkaline builders. Surface active agents

Time and Tamms produce the products you need



For half a century we have had the privilege of providing basic ingredients to industry. While we welcome new customers, the great bulk of our business comes from accounts who have been on our books as long as two generations. Tight quality control is a tradition with Tamms, and this policy insures uniformity of product, a safeguard for the quality of your products or processes. We will be delighted to send samples, specifications, and prices.

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Dept. CP-41

TIME TESTED PRODUCTS FOR INDUSTRY

Check 3260 opposite last page.

exhibit other useful characteristics such as antistatic, corrosion inhibition and lubricating properties.

Description: Products are supplied as 100% free acid or as the sodium salt. Four products of the series are now commercially available with two others being readied for commercialization.

(Gafac surface active agents are products of Antara Chemicals Division, General Aniline & Film Corporation, 435 Hudson St., New York 14, N. Y.)

Check 3261 opposite last page.

Coating resin provides 800 fpm extrusion rate at 1.1 lb/ream

Uses: Resin is expected to find particular acceptance in high-production speed, low-coating weight areas which use polyethylene for a sealing medium as well as for a barrier material. These would include laminated pouches and multi-wall bags. In addition, it has been used on foil freezer paper and boxboard of all types.

Features: Resin has been successfully used in extrusion coating at weights as low as 1.1 lb/ream with coating speeds as high as 800 fpm. It is designed to give optimum performance in applications which require low coating weights at high speeds. Coating meets requirements for military barrier applications and is approved for food packaging use, including coating of milk cartons.

Description: Designated as Poly-Eth 1018, resin has a density of 0.915 and a melt index of 12. In laboratory tests, gloss has been excellent regardless of substrate or coating weight. Adhesion, grease resistance, MVTR and sealability have proved unusually good. Edge weave, surge, neck-in, smoke and occurrence of pinholes were minimal in all cases.

(Poly-Eth 1018 is a product of Spencer Chemical Company, Dwight Building, Kansas City 5, Missouri.)

Check 3262 opposite last page.

When attitude determines altitude

In 1958, when the United States was attempting to put its first satellite in orbit, the Jupiter missile was selected as the power plant for one of the shoots. The Jupiter had the power required and the direction control to maintain the precise angle of ascent so the final stage would reach the desired altitude.

To achieve this control, small gas generators, fueled by Becco 90% H_2O_2, were clustered around the body of the missile. Jets of oxygen, generated by H_2O_2, and steam spouting from the sides served as rudders which guided Jupiter back on the desired path whenever it began to stray. Result: Explorer I had the proper attitude and went into a precise orbit at the proper altitude.

Becco H_2O_2 serves in other fields, too—as a bleach in textile and paper manufacture, as an etch for transistors, and as an oxidant in many chemical reactions. Becco, with more years of manufacturing experience than any other peroxide manufacturer, can supply you with more information about its many properties. Address: Dept. CP-61-3.

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Check 3263 opposite last page.

HOW HERCULES HELPS...

MAKE RUGGED LUGGAGE—Described by Sears, Roebuck and Co. as "the greatest step forward in luggage since leather," this new "Forecast" line based on Pro-fax®, Hercules polypropylene, is rugged, rich looking and virtually immune to staining. Distributed exclusively by Sears through its catalogues and 740 retail stores, "Forecast" luggage has been selected as a Diamond Jubilee Item for the company's 75th anniversary year.

PRODUCE HEALTHIER LIVESTOCK—Delnav® miticide, a development of Hercules' agricultural chemicals research, gives beef cattle, hogs, goats and sheep long-lasting protection from ticks and many other insect pests. Spray or dipping formulations based on Delnav require no waiting period between treatment and slaughter and avoid problems of excessive residues.

HERCULES POWDER COMPANY INCORPORATED
Hercules Tower, 910 Market Street, Wilmington 99, Delaware

CHEMICAL MATERIALS FOR INDUSTRY

HERCULES

G61-2

Check 3264 opposite last page.

Synthetic-textile dyes: four for polyesters; one for acrylics

Five dyes for synthet textiles have recently be introduced. Four have be developed for use on polyest fibers and one for acrylic f bers.

Brilliant Red FFBL — is blue shade of red for poly esters. It exhibits excelle light fastness and very goo fastness to washing and pe spiration. In wool blends stains the wool only slight even in heavy shades.

Dark Brown GL — produc neutral tans to full dark brow shades exhibiting excelle fastness to light, washin crocking and perspiration polyester fibers.

Brown 3RL — is a stron orange shade of brown fo polyester and wool-polyeste blends. It stains wool to lesser degree than do mo orange dyes.

Navy Blue RL — provide exceptionally good color valu in obtaining full bright shade of navy blue on polyester fi bers.

Eastacryl Blue 5GL — is cationic dye for acrylic fiber that achieves brilliant gree shades of blue which do no flare red under artificial ligh It exhibits excellent wet fast ness and light fastness.

(Synthetic-textile dyes ar products of Eastman Chemica Products, Inc., subsidiary o Eastman Kodak Company 260 Madison Ave., New Yor 16, N.Y.)

Check 3265 opposite last page

Discoloration is less with non-yellowing acrylic emulsion

Uses: Emulsion is designed specifically for floor-polish formulations.

Features: Acrylic resin pro-duces a film which has excel-lent non-yellowing properties and resists discoloration on aging. This property is impor-tant since trend to lighter col-ors in floors and floor cover-ings has created a demand for surface polishes which pro-

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U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

New textured metal coat for polyethylene squeeze bottles comes in range of colors.

Polyethylene Squeeze Bottles Get Metal Coat By New Vacuum Process

A new, modified vacuum-coating process for polyethylene squeeze bottles is claimed to produce adherent, textured metallic finishes in a choice of colors. Coatings applied by the new process are reported to stay on the bottle after many squeezings. The textured effect, which can be varied, is designed to eliminate glare and gaudy appearance, and to hide finger prints or other soiling. This surface takes printing without additional treatment.

Another advantage claimed for the process is that it tends to seal the polyethylene, and slow down the rate at which solvents and volatiles attack it or escape. Tests by the developer are said to indicate no measurable loss of either isopropanol or lube oil after a month in the finished bottles. Nor did these materials cause breakdown of the coated surface.

The process is being recommended for cosmetic containers, toys, etc. and is reported to be competitive on cost with ordinary vacuum metallizing of plastics.

Need for Vitamin E Found To Rise with Intake of Unsaturated Fatty Acids

Recent investigations have been conducted on the relation between unsaturated fatty acids in the diet and the body requirement for tocopherol (vitamin E). Results indicate that, although an intake of 5 mg per day of α-tocopherol may be enough for an adult having low stores of linoleic acid, intake of large amounts of vegetable oil over long periods can up this requirement to 30 mg per day.

MORE

Titanium Now Competes on Cost, For Fabricating CPI Equipment

Market for Titanium Going Up Because of Lower Prices, Stepped-Up National Defense Program

Titanium producers are now bidding for CPI equipment jobs on a cost and performance basis against common construction materials such as lead, copper, stainless steel and special nickel alloys. They believe it is no longer necessary to compete on long life alone, because titanium sponge now sells for $1.60 per pound (against $2.75 in early 1957). Thus, titanium's desirable properties, other than corrosion resistance, are now important sales advantages.

Equally important, fabricators are now more familiar with the working characteristics of the metal. Many of them have developed cost- and trouble-saving techniques for welding and other fabrication operations.

Titanium Heater Coils

For example, a recent report states that titanium heater coils are now being fabricated for sulfuric acid—metallic sulfate service in metals production. Here, titanium's ability to shed corrosion products, rather than its corrosion resistance, was the reason for its selection. In this environment, corrosion products evidently build up on coils and cut heat transfer rate. In contrast to the material previously used for these coils, the titanium is said to shed corrosion products when tanks are simply flushed with boiling water. No scrapping, chipping, or brushing is needed.

MORE

Typical CPI application for titanium is this caustic scrubber column (16 in. diam., 23 ft. long). Photo courtesy Pfaudler Permutit, Inc.

Fuel Cell Being Developed Uses Sodium, Oxygen, H_2O

According to recent reports, sodium metal is being used to fuel a new type of cell for the production of electric power. Such cells are being incorporated into a power plant prototype now under development for the Navy.

Employing the reaction of sodium with oxygen and water, these cells are claimed to have an efficiency of 60%—much higher than hydrogen—or hydrocarbon-burning cells. It is reported that they develop almost twice the voltage and current density of the hydrogen-burning cells, so that fewer cells can do the same job. Also the sodium, which is in the form of an amalgam, is easier to store than is hydrogen.

The cells weigh 2-3 lbs./kwh of capacity, including fuel storage, which is said to be only 1/30 the weight of lead-acid storage batteries of equivalent power output (75kw).

Black Polyethylene Resin Now Offered for Coatings

Black pigmented polyethylene resin for extrusion coating onto paper, paperboard or aluminum foil has just been introduced by U.S.I. This resin is expected to find application in products such as automobile door liners, agricultural mulch-coated paper and packages for photographic film or paper.

Coatings 0.75 mil (19 microns) or greater made from PETROTHENE® 201-220 polyethylene resin provide an effective light and moisture barrier. Good carbon black dispersion and the absence of non-homogeneous particles also contribute to the light-tight barrier properties of the resin. Adhesion onto paper or paperboard is excellent. For coating aluminum foil, a primer is necessary for good adhesion.

For literature on this resin, address Technical Literature Dept., U.S.I. Chemical News, 99 Park Ave., New York 16, New York.

★ U.S.I. CHEMICAL NEWS ★

CONTINUED

Titanium

A prototype titanium coil has already lasted three years in service, and is still in excellent condition, according to the report. The material previously employed lasted only nine months before corrosion build-up made it unusable.

Titanium for Defense

Thanks to the above factors, plus a stepped-up national defense program, the market for titanium has been going up. Production and sales in 1960 are estimated at over 7 million pounds, according to Reactive Metals—the integrated titanium producer owned in part by U.S.I.'s parent company, National Distillers.

Titanium weighs only about 55% as much as steel; is impervious to corrosion from salt water or acids. Some titanium alloys retain their integrity at temperatures up to 2,000°F. for short periods. That's why large quantities of the metal are going into the B-70 bomber program; into the Army's "Davy Crockett" program for equipping foot soldiers with a lightweight automatic weapon; into space vehicles and missiles; and into jet engines.

CONTINUED

Vitamin E

Prior to study, experimenters reasoned from two facts that dietary tocopherol needs might be proportional to fatty acid levels in the diet. The facts were: tocopherol acts as an antioxidant in normal tissues; unsaturated fatty acids, incorporated into depot fat as a result of high intake, increases the susceptibility of the fat to autooxidation.

Studies with both animals and humans have supported this reasoning, it is reported. In consequence, the researchers feel that those who advise supplementing the diet with vegetable oils should also provide for greater intake of tocopherol.

Have You a New Product To Tell the World About?

Make it routine to send your publicity releases on new products and developments to the Editor of U.S.I. Chemical News, often called the "Front Page of the Chemical Process Industries."

New Drum Gauging Chart Offered by U.S.I.

A new drum gauging chart, for determining how much liquid is left in an open drum, is now available from U.S.I. The new wall chart covers both 30- and 55-gallon drums. It converts wet inches of stick measurement to gallons of liquid—for drums gauged horizontally or vertically—at temperatures from 30°F. to 90°F. The chart is designed specifically for gauging ethyl alcohol, but can be used for any liquid with a similar coefficient of cubic expansion.

Copies may be obtained by addressing Technical Literature Dept., U.S.I. Chemical News, 99 Park Ave., N.Y. 16, N.Y.

TECHNICAL DEVELOPMENTS

Information about manufacturers of the items may be obtained by writing U.S.

Reagents and dye solutions for paper chromatography and electrophoresis now available in 200 ml aerosol spray bottles. Frees operator from dependence on air pressure lines. Protects reagents against contamination. **No. 19**

Complete line of first aid kits and pharmaceutical supplies for industrial, institutional or professional use is described and illustrated in new, 28-page catalog now offered. **No. 19**

Butyl myristate, butyl palmitate, butyl stearate now offered in 99.8+% purity. Because of high purity, these fatty acid derivatives are claimed useful as gas chromatography standards. Vapor phase chromatograms available for all 3. **No. 19**

New particle counter is self-contained instrument said to be useful both for research work and for monitoring particulate matter in atmospheres of such areas as clean rooms for precision manufacture and assembly. **No. 19**

Lithium aluminum tri-t-butoxy hydride, new complex hydride that reduces acid chlorides to aldehydes, now available in lab quantities. Also useful for stereospecific reductions of steroid ketones to hydroxy derivatives. **No. 19**

Amino acid analyzer described in new brochure. Gives features and use of instrument for automatic analysis of protein and peptide hydrolyzates, physiological fluids, tissue extracts, foods, culture media, pharmaceuticals. **No. 19**

New fatty hydroxamic acids, now produced commercially as chemical intermediates, have reactive OH and NH group as well as long, straight chain fatty group. Can react with alkalis, metallic ions, acylating agents. **No. 19**

Mathematical puzzles and pastimes are subject of book now being sold. Puzzles based on match-stick geometry, "once-over" curves, perpetual calendar, etc. Includes 100s of puzzles, answers, explanations, current applications. **No. 19**

New iodine titration indicator is said to be stable, with good shelf life, and to be readily soluble in cold water, giving clear colorless solution. Reacts with iodine in presence of iodide, forming deep blue complex. **No. 19**

Radioactive tracers, tagged compounds, sources, handling equipment, instruments, film badge service, health physics survey, environmental testing described in new catalog now offered. **No. 19**

PRODUCTS OF U.S.I.

PETROTHENE® . . . Polyethylene Resins

MICROTHENE . . .Finely Divided Polyethylene Resin.

Organic Solvents and Intermediates: Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Intermediates.

Ethyl Alcohol: Pure and all denatured formulas; Anhydrous and Regular Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL®M, ANSOL PR

Heavy Chemicals: Metallic Sodium, Anhydrous Ammonia, Ammonium Nitrate-Nitric Acid, Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solutions-Sulfuric Acid, Caustic Soda, Chlorine, Sodium Peroxide.

Animal Feed Products: DL-Methionine, MOREA® Premix (to authorized mixer-distributors).

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Division of National Distillers and Chemical Corporation
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duce clear, colorless coatings.

Description: Designated Rhoplex B-83, material is a modified copolymer acrylic emulsion. Films formed from this product resists soil and heel marking. It has been extensively floor-tested in a variety of formulations by an independent laboratory. Toughness, flexibility and excellent wear characteristics have been confirmed.

(Rhoplex B-83 is a product of Resinous Products Div., Rohm & Haas Company, Washington Square, Philadelphia 5, Pa.)

Check 3266 opposite last page.

Improved standard grade of diethylene glycol now available

Uses: Another chemical intermediate for emulsifiers, cosmestics, detergents, industrial cleaning compounds and alkyd resins. It can be used as a solvent for petroleum separations, polyvinyl acetate adhesives, and automotive specialties. It has also been used as a non-food humectant for cork and glassine.

Features: A narrow distillation range, more precise water-content control and reduced acidity offer diethylene glycol users the benefits of more uniform product quality and process control.

Description: Improved diethylene glycol is available at the same prices as former standard grade.

Specifications	Old	New
Distillation (760 mm)		
IBP (°C min)	235	242
DP (°C max)	255	250
Water (% max)	0.2	0.20
Acidity (% by weight as acetic acid, max)	0.01	0.005

(Diethylene glycol is a product of Union Carbide Chemicals Company, Division of Union Carbide Corporation, 270 Park Ave., New York 17, New York.)

Check 3267 oposite last page.

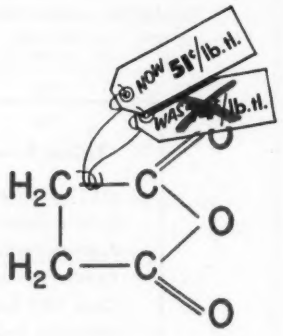
For more information on product at left, circle 3268 . . . see information service request blank opposite last page.

Success Story!

New capacity to meet increased use

National® SUCCINIC ANHYDRIDE

at our new low "incentive price"



It worked! Our low "incentive price" on National SUCCINIC ANHYDRIDE justified a major increase in production capacity. Now we can supply additional new users who wish to benefit by the big value in this unique "small molecule" intermediate. Here are the facts:

IT IMPROVES PRODUCTS Imparts many valuable properties to coatings, resins, plasticizers, elastomers, adhesives. It is also emerging as an important intermediate in pigments, pharmaceuticals, cosmetics, perfumes, corrosion preventives, lube-oil additives, insect repellents and the like.

IT'S PRICED FOR USE Now costs 51¢ lb. t.l.—33⅓% less than a year ago—so it is now economic for many volume uses. Still wider use may further reduce its cost to about that of other dibasic acid anhydrides.

IT'S AMPLY AVAILABLE Only producer of succinic anhydride for sale, National Aniline has long experience, integrated production and efficient manufacturing processes. We can supply your needs now and into the foreseeable future.

WHAT YOU SHOULD DO NOW Send for our comprehensive Technical Bulletin and a working sample of National SUCCINIC ANHYDRIDE. Find out what it can do to improve your products, increase sales, open new product opportunities. Check what possible future price reductions can also mean to you. Use the handy coupon below for prompt action.

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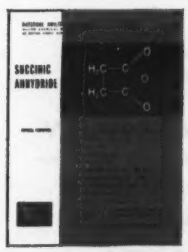

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☐ Please send working sample

☐ Have representative call by appointment

Name_____ Title_____

Company_____

Address_____

Check 3269 opposite last page.

ELIMINATE

CHEMICAL WOBBLE

with NALCO® Organics

A peg that almost—but not quite—fits a hole will wobble when placed in that hole. The same principle applies to organic processes. An organic chemical *may* be applicable (to one degree or another) in a given process. But if it doesn't fit the process exactly, the result is "chemical wobble".

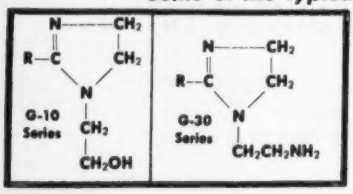
The way to avoid chemical wobble in *your* processes is to use a custom made organic, manufactured specifically to meet your individual requirements. And when you need custom made organics, Nalco Chemical Company is the place to look for them.

Nalco has already helped many manufacturers eliminate chemical wobble, supplying them with specific organics to meet specific needs. (Don't ask what they are, however—Nalco keeps all customers' requirements, and the nature of the organics made for them, in strict confidence.)

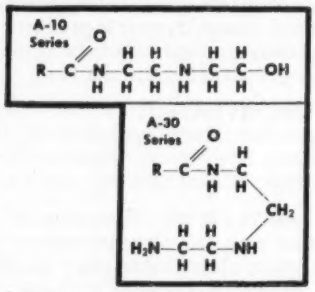
In many cases, the manufacturer had to do no more than submit his requirements to Nalco. Nalco researchers then developed the exact chemical to meet his needs, and also determined the most efficient and economical method of manufacturing it.

Nalco organics include surface active agents, film-formers, emulsifiers, and dispersants. Among their many uses, they are suitable for corrosion inhibitors, bactericides, antistatic agents, plasticizers, flotation reagents, pigment grinding and flushing aids, wetting agents, and foaming agents. Many are also specific chemical intermediates.

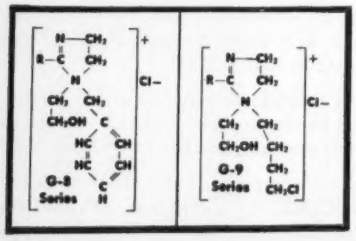
Some of the typical Nalco organics:



Fatty Imidazoline Monoamines and Diamines — (*Nalcamine*® G-10 and G-30 series) derived from various fatty monocarboxylic acids and polyamines.



Fatty Amidomonoamines and Amidodiamines—(Nalcamine A-Series Products) derived from fatty monocarboxylic acids (C_6 C_{18}) and polyamines.



Quaternary Ammonium Chlorides — derived from various Nalcamine products.

Oxyalkylation products. These include adducts of abitol, castor oil, alkyl phenols, phenolic resins, tall oils, and fatty amides, polyalkanol polyamines, and polyglycol monoethers.

These organics, and many others, can be manufactured to your specifications, in quantities from a few gallons to tank car lots. When you need a specific chemical *to eliminate a wobble* in your processes, call on Nalco.

Further information, technical data, and samples of the materials mentioned here are available on request. For a more detailed outline of Nalco organics, write for Nalco Bulletin K-6.

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Nalco CHEMICALS

Check 3270 opposite last page.

CHEMICAL MATERIALS

$Al_6Si_2O_{13}$ ups modulus and tensile in polymers

Surface-modified aluminum silicate improves performance as a reinforcing filler in polymer systems

A MODIFIED kaolin recently introduced offers faster cures and easier processing. Because of the organophilic surface modification of this aluminum silicate (called ASP 106), the material is easier to incorporate into polymer systems. Easier processing results from improved wettability and dispersibility. In initial applications the end product has demonstrated improved modulus and tensile strength, better insulating properties.

The material is derived from a water-washed, water-fractionated kaolin, shows good uniformity of particle size, freedom from grit and foreign matter, and brighter color. Typical properties are shown in Table 1.

Use in GRS

When used in an all-purpose, non-discoloring butadiene-styrene copolymer, the resulting products have faster

Table 1 — Typical properties of ASP 106

pH (Tappi Tent. Std. T645 M-54)	9.5-10.5
Particle Shape	Thin Flat plate
Average Particle Size	0.55 micron
Residue, 325 Mesh, Maximum	0.01%
Color (GE Brightness)	86-88%
Refractive Index	1.56
Specific Gravity	2.58
Bulking Value	21.5 lb/gal
	0.04653 gal/lb
Free Moisture, Maximum	1%

Table 2 — Typical test formulation

	Parts (Weight basis)	Per Cent (on rubber)
Polymer	300	—
Light Process Oil	30	10
ZnO	15	5
Sulfur	6	2
Altax*	5.25	1.75
ASP 106	300	100

*Mercaptobenzothiazoldisulfide

cure, higher modulus and higher tensile strength. To demonstrate the efficiency of the product the basic formulation shown in Table 2 was used as standard preparation.

In experimental work this formula was mixed in a two-roll mill with ingredients added in the following order (as per ASTM D15-41): polymer, softener, filler, sulfur, accelerator, ZnO.

After 24-hr storage, the mix was rolled into a sheet, cut with a die to mold size and cured for various periods at 274°F. Mixing the modified kaolin proved to be much easier than mixing unmodified clays. Performance data, including cure-time modulus, tensile strength and elongation, and set at break, are shown in accompanying Table 3.

Comparison of Reinforcing Fillers

The comparative tests made with various reinforcing fillers in GRS rubber (Table 4) show that the new product has better modulus and tensile strength at shorter cure times. Formulation was the same for all fillers.

(ASP 106 is a product of Minerals & Chemicals Corporation of America, Menlo Park, New Jersey)

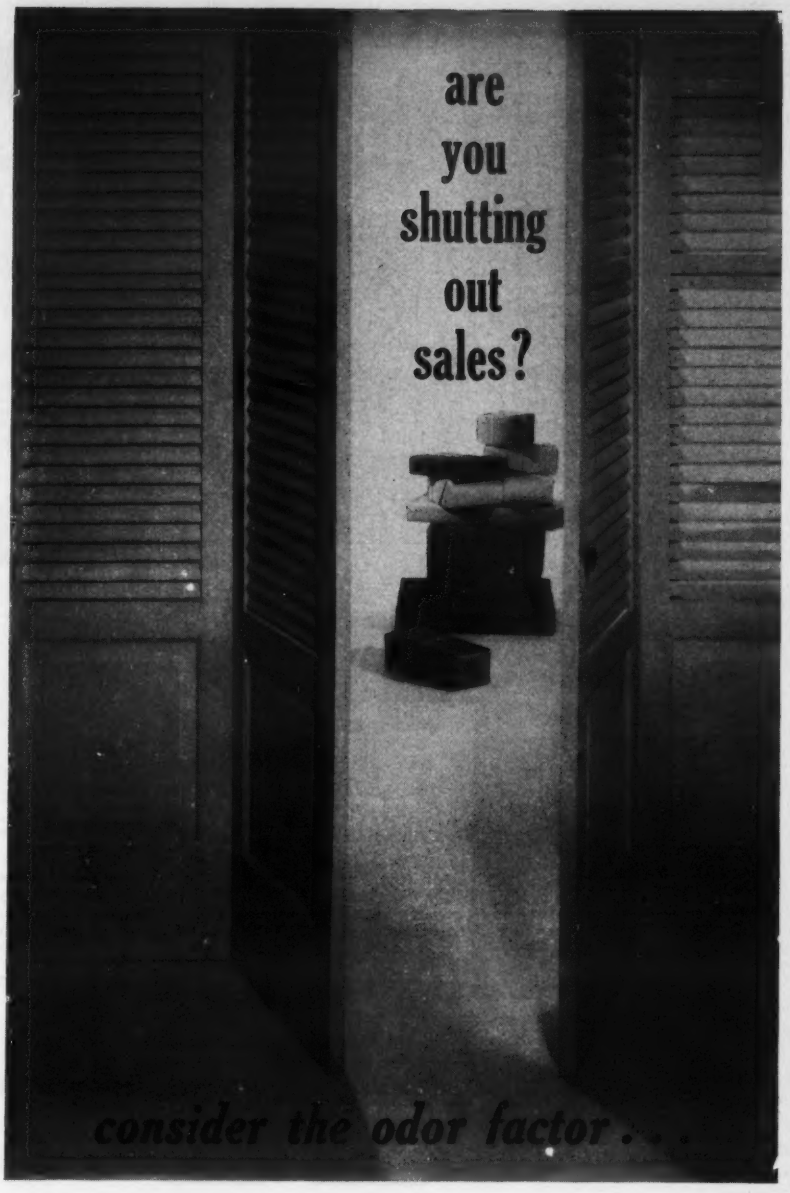
Check 3271 opposite last page.

Table 3 — Performance data on ASP 106 in GRS
(Cured at 274°F)

Curing time Minutes	Modulus lb/sq in 300% Elongation	500% Elongation	Tensile at break lb/sq in	Elongation at Break, %	Set at Break %
15	800	1150	1200	550	50
20	800	1200	1300	500	50
30	800	1300	1300	500	50

Table 4 — Comparison of reinforcing fillers in GRS
(Cured at 292°F.)

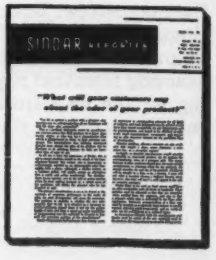
Reinforcing Filler Identification	Curing Time Minutes	Modulus, Lb/sq in 300% Elongation	Tensile at Break Lb/sq in	Elongation at Break	Shore Hardness %
ASP 106	7	550	1550	680	65
	10	550	1400	650	67
	15	600	1350	620	67
	20	780	1350	520	68
	25	800	1300	500	72
Unmodified Water-washed, fractionated kaolin clay (ASP 200)	60	300	850	900	—
	80	380	1020	850	—
Precipitated $CaCO_3$	20	200	800	600	20
	30	250	800	800	—
	40	200	600	800	—
South Carolina hard clay	60	400	750	700	20
	80	500	1100	700	—
	120	620	1100	700	—



How many products have every chance for success, yet somehow never quite make it . . . because the odor factor is wrong. This important sales-motivator . . . so often misunderstood and frequently overlooked . . . can spell the difference between marketing success and failure. And right there is where Sindar can help you with its tremendous facilities and high degree of specialization in the field of odor.

Whether your problem is simply one of masking out an unpleasant odor, or creating a new and proper selling fragrance . . . call in Sindar. No other firm has helped so many industrial and consumer products to better sales through proper understanding of the odor factor.

FREE! Send for the Sindar Reporter . . . our house publication that discusses the odor factor in detail for industrial products and problems. It's filled with important technical and marketing information that could be vital to your manufacturing and selling program. Receive it regularly without obligation. Write today.



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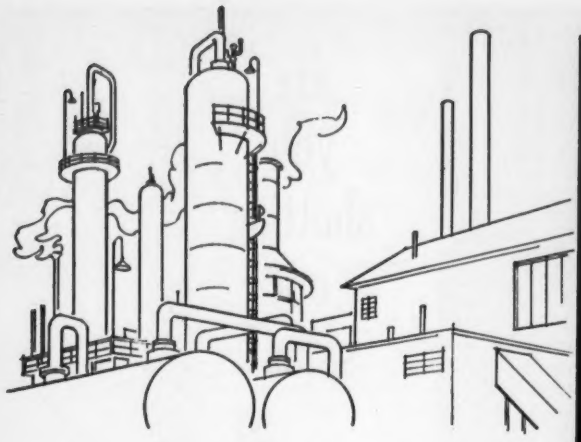
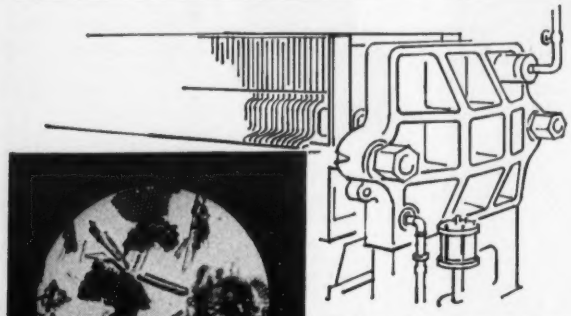
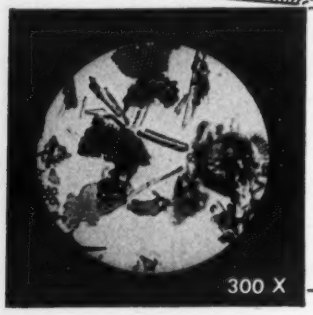


For flow rate plus clarity—Hyflo Super-Cel has the right combination of large and fine particles. Heavily used in chemical processes such as caustic soda production.





For fast flow rates—Celite 545 has a higher proportion of coarse particles. Frequently used for clarification of resins and other viscous liquids.

For maximum clarity—Filter-Cel has a relatively fine particle size distribution. Used in producing lard, salad oil, other hydrogenated oil products.

In diatomites, Johns-Manville precision processing works for you

Celite has the exact grade for every filtration need from fast flow rate to maximum clarity

Study samples of various filtration grades of Celite* diatomite with the unaided eye. Rub them between your fingers. One grade looks, feels very much like another.

Then compare these grades under the microscope. Each has its own distinctive particle size distribution. Each is precision-milled to fill the most exacting filtration requirements, ranging all the way from maximum flow rate to maximum clarity.

Celite 545, for example, with a higher proportion of large to fine particles, is used to remove large suspended impurities at maximum flow rates. *Hyflo Super-Cel®* has a balanced particle size distribution, combines good liquid clarity and moderate flow rate. But *Filter-Cel®* has a much higher ratio of small particles, is tailored for use where high clarity outweighs flow rate.

Whatever your filtration problem—Johns-Manville can furnish the "right" grade for the job. You have a choice of 9 intermediate grades *plus* many special grades. Each comes from the largest and purest commercially available deposit. Each is processed and graded at the same plant under the same uniform conditions.

For information on specific filtration or mineral filler problems, talk to your nearby Celite engineer, or write to us. Johns-Manville, Box 14, N. Y. 16, N. Y. In Canada, Port Credit, Ont.

*Celite is Johns-Manville's registered trademark for its diatomaceous silica products

JOHNS-MANVILLE

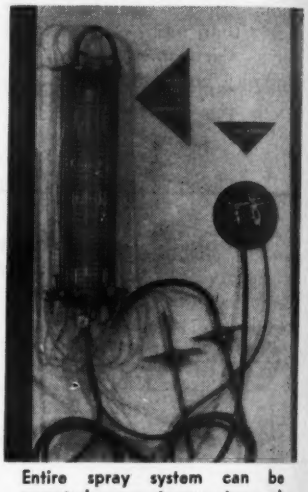
Check 3273 opposite last page.

Visible feed proves proper ratio of resin to catalyst

Uses: Spraying polyester resins for coatings or forming.

Features: Visible feed system gives positive proof that proper ratio of polyester to peroxide is accurately maintained.

Description: Two-component catalyst gun and spray apparatus can be made portable with an inexpensive rack with wheels. Spray nozzle has a small pipe centrally located within a larger pipe. Ingredients are blended outside the nozzle tip, so there is no opportunity for them to mix in the gun. Air pressure is used over the two components to assist flow to the spray gun. This permits the use of thixotropic and pigmented finishes as well as other catalyst systems.



Entire spray system can be mounted on an inexpensive rack with wheels for increased mobility

(Zippel spray system is supplied by Naftone, Inc., 425 Park Ave., New York 22, New York.)

Check 3274 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Inventory needs reduced by white polyethylene for extrusion uses

Uses: White polyethylene can be blended with any of company's polyethylene extrusion and film resins to suit specific end-use requirements.

Features: Polyethylene 6407 (45% concentrate) eliminates need to maintain large and costly inventories of white polyethylene blends for various applications.

Description: Concentrate is compounded with company's polyethylene 70 and a rutile titanium dioxide pigment which is said to reduce materially screenpack and nonuniform pigment feed. For any concentration below 45%, concentrate can be blended in standard dry tumbling equipment or preblenders and the mechanical mixture fed directly into extruder. Resin combines toughness, heat sealability and moisture resistance of polyethylene with a smooth, bright surface.

(Polyethlene 6407 is a product of Plastics Division, Monsanto Chemical Company, Springfield, Mass.)

Check 3275 opposite last page.

Effectively sequester iron from alkaline solutions

Two sequestrants, especially effective in sequestering iron from strongly alkaline solutions, are now available in commercial quantities. Products are water solutions composed chiefly of sodium beta-glucoheptonate. They sequester not only iron but calcium and magnesium as well as other metal ions such as aluminum copper. nickel, manganese, cobalt, zinc and silver. Principal applications have been in fields of alkaline derusting and cleaning, and in treating hard or rusty water. Two liquid series and one dry form are available.

("Seqlene" sequestrants are available from the A. E. Staley Manufacturing Company, Decatur, Illinois.)

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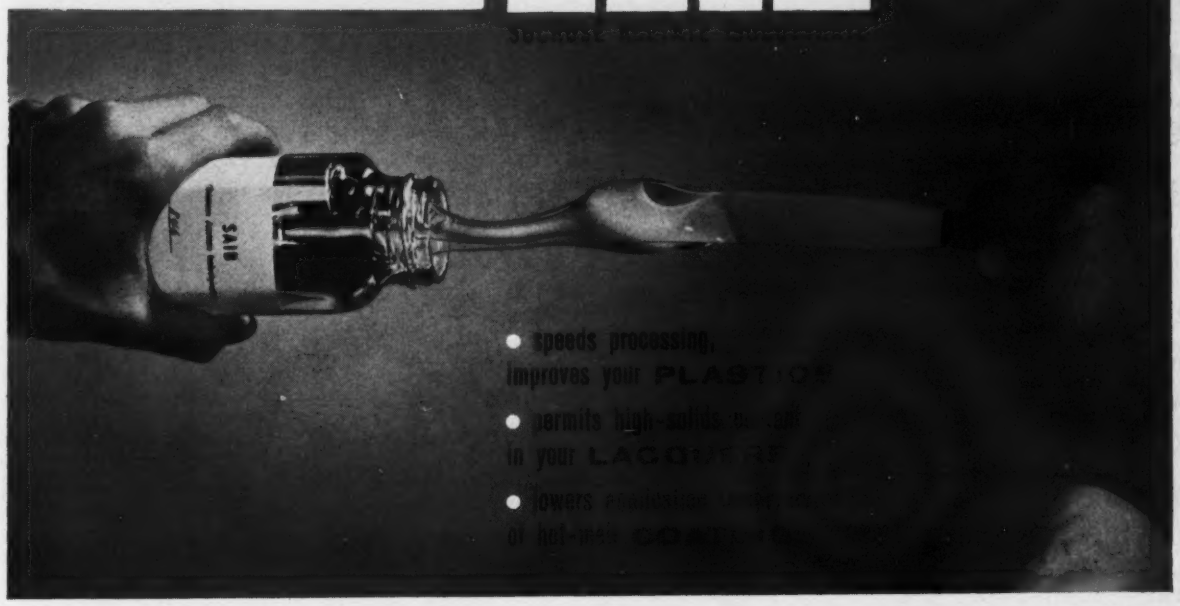
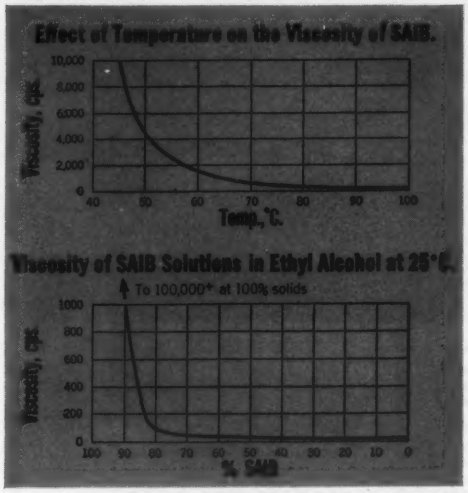
Multi-functional SAIB



Eastman's SAIB—Sucrose Acetate Isobutyrate—is truly a unique material. A semi-solid at room temperature, its viscosity (above 100,000 cps.) drops sharply with a rise in temperature, becomes only 100 cps. at 100°C. It is exceptionally soluble in most common lacquer solvents. The viscosity of a 50% solution of SAIB in ethyl alcohol, for example, is only 8 cps. And it is compatible with a wide variety of polymers, modifiers and plasticizers.



IN CELLULOSE ACETATE PLASTICS, formulated with dimethyl phthalate and similarly active plasticizers, SAIB provides easier dry blending, faster molding and extrusion rates, and improved physical properties.

IN LACQUERS, because of its wide compatibility and exceptional solubility, SAIB permits formulation of high-solids lacquers at practical application viscosities. In cellulose nitrate and cellulose acetate formulations SAIB can also be used to increase film hardness. In vinyl and acrylic coatings SAIB improves sprayability.

IN MELT COATINGS, the excellent compatibility, stability, and permanence characteristics of SAIB make it a useful modifier for hot melt and peelable plastic formulations. Tough, flexible melt coatings that won't fume at melt temperatures have been formulated containing up to 70% SAIB. Operating temperatures are also reduced.

SAIB is available either undiluted or as a 90% solution in ethyl alcohol. For samples, and a report on physical properties and performance data, call or write your nearest Eastman sales office.

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SUCROSE ACETATE ISOBUTYRATE

Eastman CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; Atlanta; Boston; Buffalo; Chicago; Cincinnati; Cleveland; Detroit; Greensboro, North Carolina; Houston; Kansas City, Missouri; New York City; Philadelphia; St. Louis.
Western Sales Representative: Wilson & Geo. Meyer & Company, San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

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But to offer your customer a better product you must often switch to a new advanced raw material.

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Rapid cleanup of epoxies and urethanes achieved with thixotropic dip

Uses: Product is used for rapid cleanup of cured epoxy resins, polyurethanes and similar materials.

Features: Thixotropic material may be used as a dip or can be brush applied. Painted on epoxy coated surfaces, usually five to ten minutes soak are enough to remove the cured resin.

Description: Isochemstrip 708 is a fast acting stripping solvent which attacks and disintegrates epoxy and polyester compounds. Supplied in thixotropic form, it has low volatility and no detrimental effect on metal.

(Isochemstrip 708 is a product of Isochem Resins Company, 221 Oak St., Providence 9, Rhode Island.)

Check 3279 opposite last page.

NEW LITERATURE
Chemical Materials

Use of phosphoric acid as a soil stabilizer is described in 13-page technical bulletin. Field and laboratory tests and results and test procedures are included along with photographs showing application methods. Booklet I-186 — Inorganic Chemicals Division, Monsanto Chemical Company.

Check 3280 opposite last page.

Caustic soda is comprehensively treated in 40-page booklet featuring 10 pages of graphs and tables. Special sections are devoted to determining costs of caustic shipments and to a discussion of best methods of shipping and handling. Complete analysis and first aid procedures are included. "Caustic Soda" — Technical Literature Department, U. S. Industrial Chemicals Company, Division of National Distillers and Chemical Corporation.

Check 3281 opposite last page.

Activated carbons are subject of technical data sheet that describes physical properties, application, average life and shipping and freight classification. Bul G-32-1060 — Chemical Products Division of Chemetron Corporation.

Check 3282 opposite last page.

30 alkalies to choose from

This kind of variety is more than sheer spice. It represents higher profits, because you can purchase almost any form and grade of alkali you need. It follows that processing and repackaging costs go down.

You save on purchasing costs too, because two or more of these consistently uniform alkalies can be ordered *together* in mixed carloads or mixed truckloads. One order, one billing, one responsibility—cuts buying and bookkeeping red tape.

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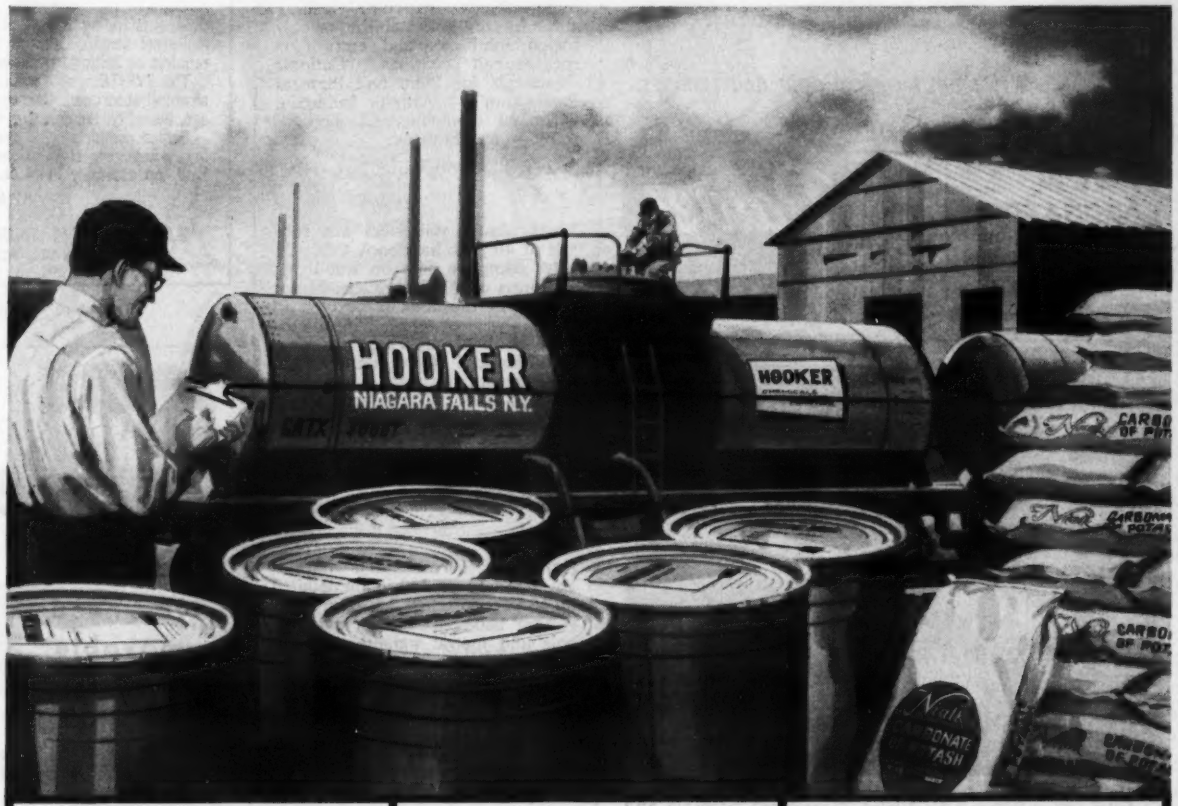
The wider mouth also makes the drums more adaptable to re-use.

The next time you're considering alkali requirements, call in our representative who is trained in the economics of these alkalies. Some of his ideas can work to your advantage.



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Rayon grade liquid 73%
Solid
Regular Flake
Crystal Flake
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Phosphated
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Liquid forms available in tank cars and tank trucks, dry forms in drums.

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Standard Grades
Liquid 45-52%
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Granular, Walnut, Broken, Powder and Crushed—all 90%

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Liquid 45-52%
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Liquid forms available in tank cars and tank trucks, dry forms in drums.

CARBONATE OF POTASH

Hydrate, Regular 83.5-84.0%
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Calcined, Powder 91-94%
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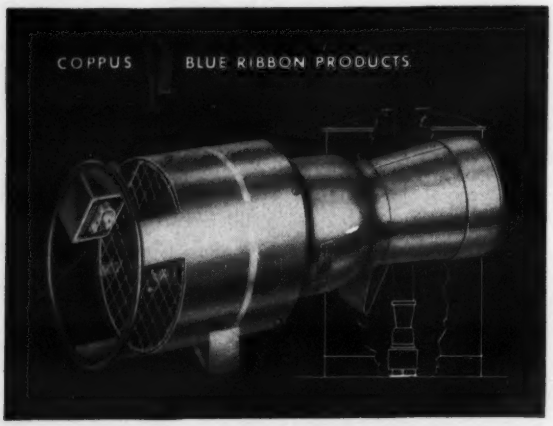

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Check 3285 opposite last page.

CHEMICAL MATERIALS

Alkylphenol surface active agents are discussed in 16-page brochure that contains graphic and tabular data and includes a number of application illustrations. Products discussed are generically known as alkylphenoxy polyethoxy ethanol compounds. Characteristics such as physical properties, solubility, compatibility, viscosity and surface and interfacial tension are tabulated. "Triton-alkylphenol Surfactants" — Agricultural and Sanitary Chemicals Department, Rohm & Haas Company.

Check 3286 opposite last page.

Use of cationic chemicals in paint and pigment production is covered in pamphlet of four pages. It explains methods for introducing chemicals into pigments and lists those effective as color flushing aids, freeze-thaw stabilizers, corrosion inhibitors and emulsifiers for asphalt coatings. "Cationic Chemicals for Paint and Pigment Production" — Armour Industrial Chemical Company, Division of Armour & Company.

Check 3287 opposite last page.

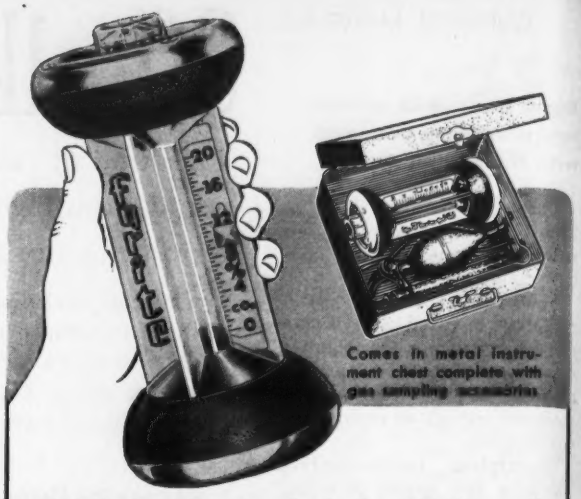
Vinyl plastic stabilizers are subject of 40-page handbook that provides complete data on stabilizing all forms of vinyl products. Major portion of the book is devoted to an analysis of special problems such as light and heat stability, blooming and sulfur staining. Another section provides a complete description of all standard quality control performance tests. "Stabilizer Handbook" — Ferro Chemical Division of Ferro Corporation.

Check 3288 opposite last page.

Antibiotics, narcotics and vitamins are among over 300 items detailed in 68-page product list. Narcotics section lists packings in avoirdupois and metric weights and features a conversion table for extra convenience. Booklet includes an illustrated section on company's confidential development and production facilities and a list of available technical publications. "Product List" — NYQ Chemical Division, S. B. Penick & Company.

Check 3289 opposite last page.

Glass-fiber-reinforced plastics receive thorough treatment in 32-page illustrated booklet. Resins, reinforcements and releases used in laminating and casting are described. Technical data on contact and spray-up molding are included. Booklet also contains a 24-plate chart of color paste dispersions and a list of technical references. A copy of Catalog C can be obtained on letterhead request to Allied Resin Products Corporation, Hingham Industrial Center, Hingham, Mass.



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The FYRITE measures CO_2 directly by the fundamental method of chemical absorption. Consequently, the reading is independent of voltage, humidity, temperature, or atmospheric pressure conditions.

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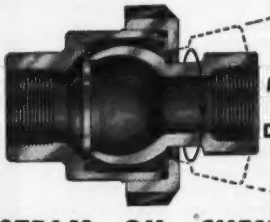
BARCO *Flexible* **BALL JOINTS**

—when you need movable joints in piping handling



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- Provides for movement in piping—up to 40° side flexibility, plus 360° rotating movement.
- Stainless steel and chemically inert gaskets for strong chemicals. No metal-to-metal contact. Choice of body materials.
- One Barco Ball Joint does the work of two or more ordinary swivel joints because "it moves in any direction!"
- Many models available. For pressures to 4,500 psi; temperatures to 1000°F. 15 different sizes. ¼" to 12". *Ask for recommendations.* BARCO MFG. CO., 537E Hough St., Barrington, Illinois.

THE ONLY TRULY COMPLETE LINE OF FLEXIBLE BALL, SWIVEL, SWING AND REVOLVING JOINTS

Check 3291 opposite last page.

High-pressure acetylene derivatives are detailed in a ready-reference data sheet in three-page fold-out form suitable for bulletin board mounting. Chemical structures, physical forms and descriptions are given, as well as a listing of properties and uses. Bulletin AP-60-3 — Acetylene Chemicals Department, Antara Chemicals, Division of General Aniline & Film Corporation.

Check 3292 opposite last page.

Pearl pigments brochure contains general discussion of problems of orientation and techniques, types available and other pertinent data. Properties, typical uses and general procedure for application are included. "Rona Pearl Pigments" — Rona Pearl Corporation, Div. Rona Laboratories, Inc.

Check 3293 opposite last page.

Uses of citric acid as they pertain to industrial, food and pharmaceutical industries are covered in 30-page illustrated brochure. Included is information on particle-size specifications of the acid, packaging and storage conditions, plus a section of graphs and tables pertaining to chemical and physical properties. "Citric Acid" — Miles Chemical Company.

Check 3294 opposite last page.

Flame-retardant industrial thermosetting laminated plastic is discussed in technical data sheet that includes typical property values on plain or copper-clad material and sheets, strips and panels. "Synthane Grade FR-2 Bulletin" — Synthane Corporation.

Check 3295 opposite last page.

Rare earths are subject of two sets of data sheets recently made available. "Catalytic Properties of Rare Earths" and "The Use of Rare Earths and Their Allied Elements in Dielectric Ceramic Materials" — Vitro Chemical Company.

Check 3296 opposite last page.

Surface active agents and specialty products for industrial and textile trade are listed in catalog that includes chemical and physical descriptions. Specific applications and general use suggestions are presented for 100 products. "Industrial Chemicals Catalog" — Onyx Chemical Corporation.

Check 3297 opposite last page.

Aluminas, magnesias, limes and dolomites are described in buyer's reference folder. "Industrial Chemical Products Bulletin" — Kaiser Refractories & Chemicals Div. of Kaiser Aluminum & Chemical Sales.

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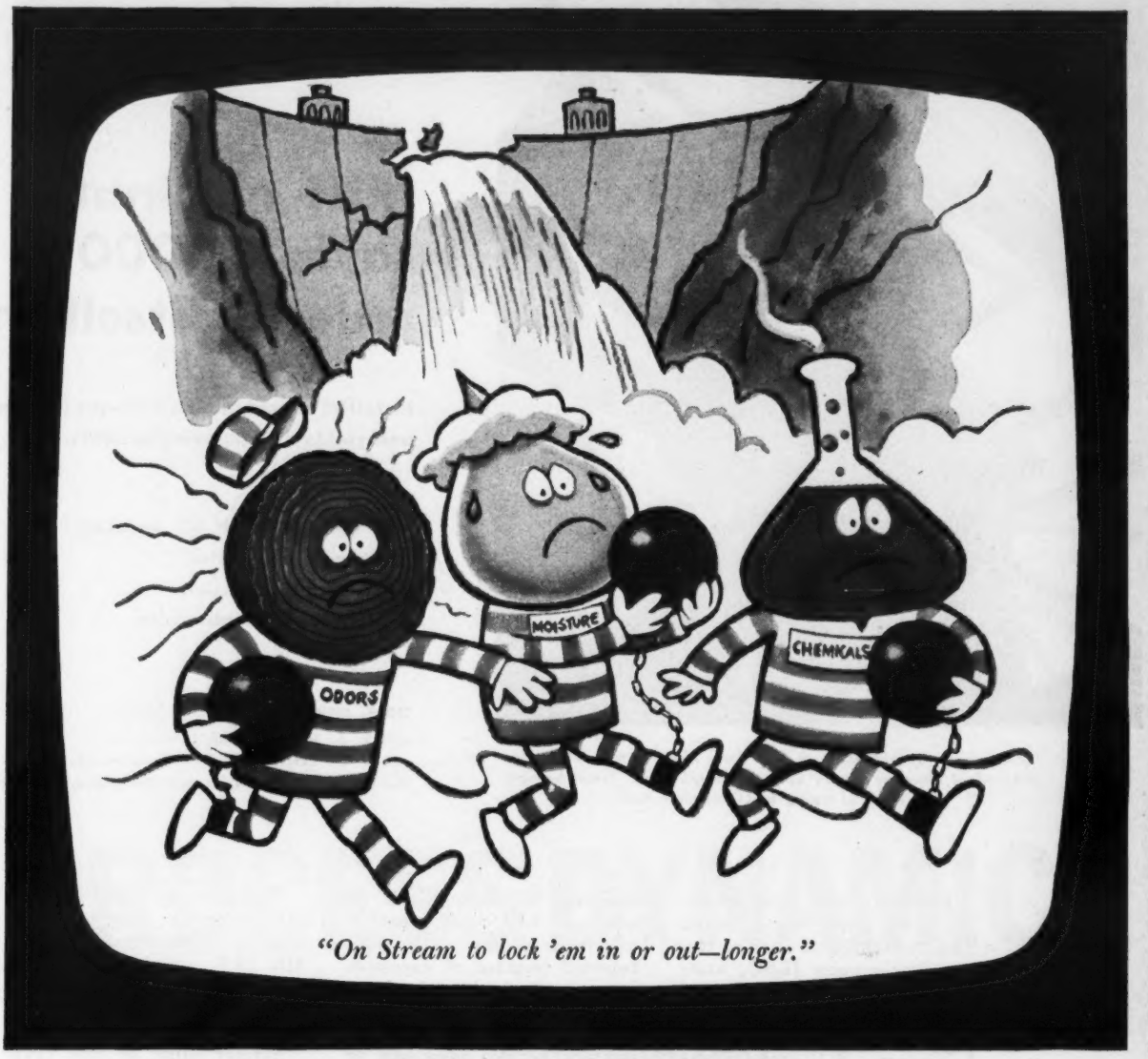

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POLYVINYLIDENE CHLORIDE LATEX FOR PROTECTIVE COATINGS

Our 14,000,000 pound RESYN 3600 plant is now "on stream" at Meredosia, Illinois. This marks the first commercial production of National's water dispersed polyvinylidene chloride and brings combined capacity at Meredosia to more than 80 million pounds of polymer emulsions and latices annually.

RESYN 3600 promises a revolution in protective coatings with simple low cost application by high speed coating machines or spraying. Its barrier properties are exciting and exceptional:

MOISTURE—Moisture vapor transmission is 2½ to 5 times lower than that of polyethylene. ODORS—Resistance to transmission of common gases 1000-2000 times greater than polyethylene. CHEMICALS—Almost complete non-reactivity to concentrated acids, solvents, alkalies and other corrosive materials. Completely resistant to grease and oil. Fire retardancy is excellent.

RESYN 3600 can be coated on paper, paperboard, plastic and other substrates. It also may be applied to fibers. It is of interest to a broad range of industries, including food and other types of packaging, converting, chemical, and textile. Call or write your nearest National office for full information.

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Check 3299 opposite last page.

Photos by CP Staff

Acid plant superintendent R. D. Dent inspects mist eliminator installed in chamber plant's exit-gas exhaust stack. Vessel housing is made of type 316 ELC stainless steel

Mist eliminator saves $3000 a year, redeems itself in 14 months

Installed in acid plant's exit-gas exhaust stack, unit yields the following benefits:

- **Traps 1000 lb H_2SO_4 per day**
- **Stops air pollution**
- **Ends roof corrosion**
- **Recovers valuable niter**

TED F. MEINHOLD, Associate Editor
with **E. A. HEISLER,** Chief Chemist
and **R. D. DENT,** Acid Plant Superintendent
The Baugh Chemical Company, Baltimore, Maryland

Problem: Acid mist escaping with gases being vented from scrubbing towers of two chamber-process H_2SO_4 units caused damage to roofs and buildings at The Baugh Chemical Company, Baltimore, Maryland. Corrosive effects of the acid particles were such that repair costs for metal roofs located near the two exhaust stacks were excessive.

A NEW SOLUTIONS FEATURE

Approximately 9000-10,000 cfm of gas were being released through each of the stacks. Tests showed that acid content of the exit gases was about 10-30 mg H_2SO_4 per cu ft.

The two acid units produce 60° Baumé H_2SO_4, primarily for use in Baugh's sodium fluosilicate, superphosphate and other premium-grade mixed-fertilizer manufacturing operations.

Solution: Various separators, filters and other devices capable of trapping the acid particles were investigated. The majority of these units — although they could probably effectively do the job — were rejected because of excessive pressure drop through them. To overcome the high resistance, costly additional blower capacity would have had to be added.

After a thorough investigation, a device known as a "Plume-Doom" mist eliminator was installed on the exhaust stack of No. 1 acid unit. A relatively simple and inexpensive (it cost $2285) wire-mesh-device, the separator was expected to operate — without the use of a fan — at a pressure drop of less than 1" water.

Design called for a separator measuring 5' diam x 9' high. Interior contains two sections of 6"-thick wire-mesh pads, mounted horizontally one above the other and spaced to provide maximum mist-removal efficiency with minimum pressure drop. Total absorption surface provided by the wire pads is approximately 1500 sq ft.

The pads are made of type 316 stainless steel. Vessel housing is constructed of type 316 ELC stainless-steel 11-gage plate. Support grids for the wire-mesh pads are also of type 316 ELC stainless steel.

Similar units of this type have shown that they can successfully remove small particles of sulfuric or phosphoric acid mist in the 1- to 5-micron range. Depending upon input acid loadings, efficiencies in range of 93 to 99% or better (on weight basis) have been reported.

Separators can be con-

Small plastic line returns 60° Baumé H_2SO_4 trapped by separator to acid tank. Although stream shown here is small, total amount adds up to 1000 lb per day

structed of stainless, carbon, PVC-lined or other steels. The wire-mesh pads are available in stainless steel, Carpenter 20, Hastelloy B and C, saran or tantalum.

Results: Installed in December 1959, the mist eliminator promptly ended the annoying air pollution and roof corrosion problems around No. 1 acid plant's exhaust stack. During the unit's first month of operation, an almost constant check was made of nearby roof surfaces. All remained free of acid — stopping the expensive roof corrosion.

Engineers were delighted to find that the separator recovered approximately 1000 lb per day of 60-61° Baumé H_2SO_4. Valued at $18.60 per ton — and formerly lost to the atmosphere — the recovered acid brings savings of approximately $3000 per year.

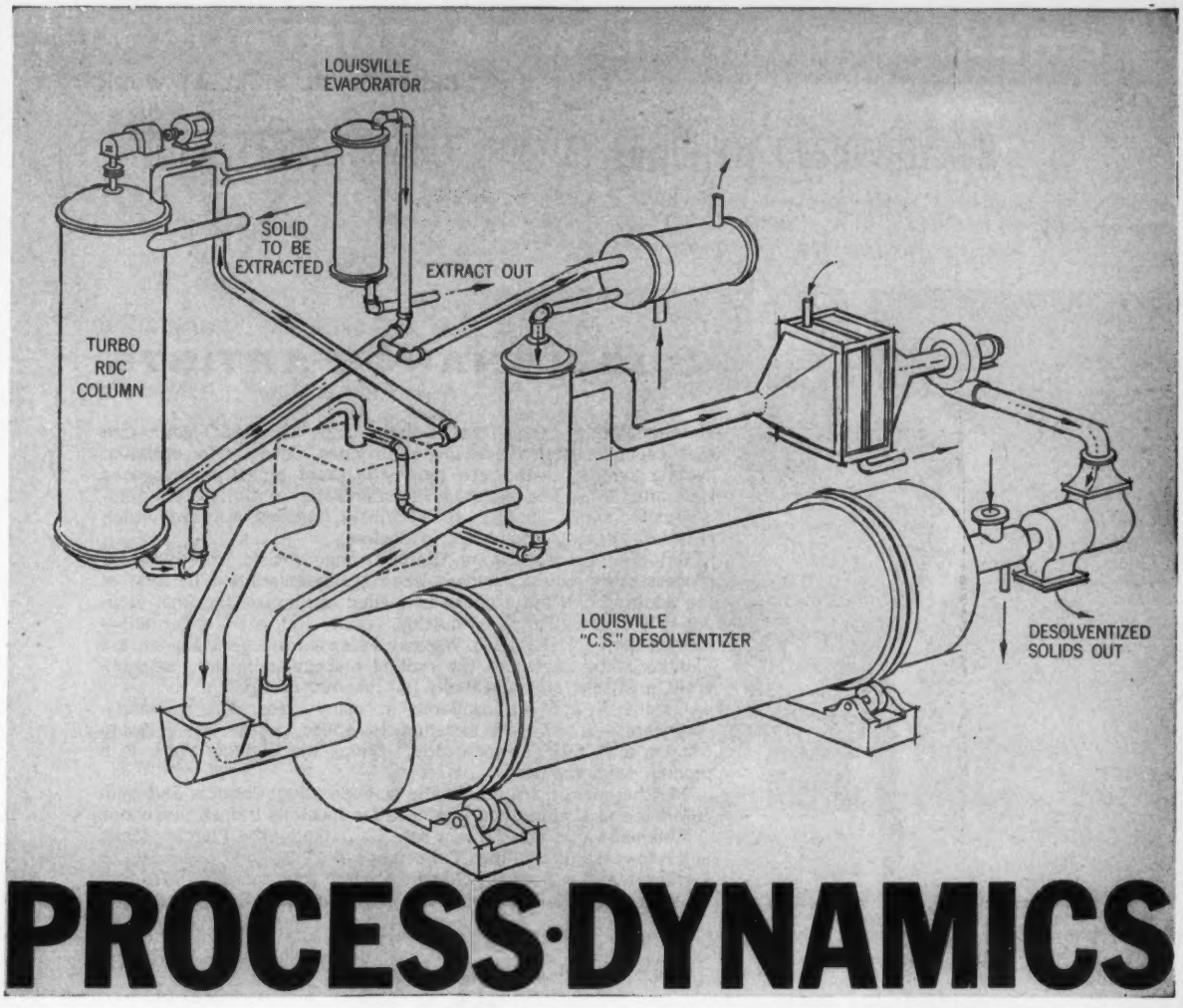
Calculations revealed that the device had a mist separation effiiciency of over 95%. Pressure drop through it never exceeded ¾" water, often dropping below ½".

Another bonus resulted from the use of the unit. Analysis of the recovered acid revealed that it contained considerable amounts of niter (averaging about 40 oz $NaNO_3$ equivalent per cu ft of acid). Since this could be reused in the process, its recovery further increased the total savings.

Compiling all of the above savings and advantages, the company was convinced that the mist eliminator would completely pay for itself (including installation costs) in less than 14 months of operation.

Based on this, a similar device was ordered for the exhaust stack of No. 2 acid plant. The unit went into service in April 1960. Results were comparable with those of the first.

Price of the second was slightly higher ($670 more than the first) because provisions were provided to permit stronger H_2SO_4 to be circulated through it. Since the solubility of niter in H_2SO_4 increases with higher acid concentration, it may be possible to augment niter



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General American's wide diversification permits the design of equipment for *controlled performance* and *process in transport*. This diversification plus specialized experience and extensive laboratory facilities assures you of correct equipment construction and maximum utilization of automated systems.

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Check 3300 opposite last page.

CENTRIFUGAL SKILL AT WORK

QUICK CHANGE ARTISTS

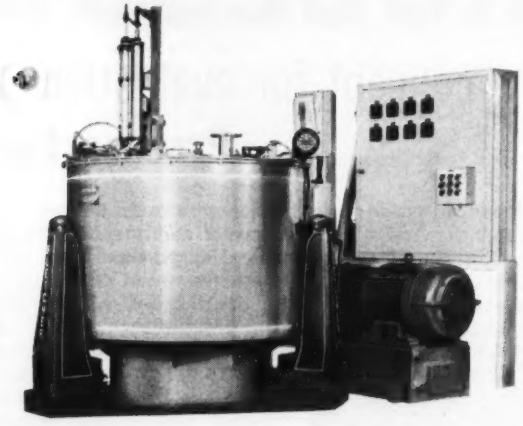
Fletcher-Matics—both Tornado-Matic and Suspend-O-Matic—are high capacity batch processing centrifuges. Once set for optimum cycling conditions—they give **automatic, exact,** repeat performances time after time. The exclusive Fletcher-Matic control system automatically starts, feeds, spins, rinses, brakes, unloads—**then recycles**—on a 24-hour basis, if desired.

But—Fletcher-Matics are Quick Change Artists, too! When a process **does** require change—when a slight variation in RPM or the addition of a cycle phase is needed to improve the final product—Fletcher-Matics are quickly, easily adjusted **externally**—without need for shutdown. Without a stop—without a stammer, the Fletcher-Matic continues the cycling process—mimicking **immediately, precisely,** and **repeatedly** the inserted changes.

Fletcher-Matics are available in many sizes. They're safety-engineered—any undue variation in speed, phase, or pressure triggers a "safety control center," brings the Fletcher-Matic to a prompt, safe, full stop.

Fletcher-Matics are practically self-operating. Controls and indicators are **so simple** there's no need for specially trained personnel.

Automatic . . . flexible . . . safe . . . stable—the Fletcher-Matic is a showcase of Sharples Centrifugal Skill at Work. See how the Tornado-Matic or Suspend-O-Matic fits into your operation. Write for Bulletin 202-560—Fletcher-Matic High Capacity Centrifuges.



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Check 3301 opposite last page.

recovery in this way.

With two mist eliminators operating, the plant has solved all of the problems formerly associated with the escaping acid mist. Since startup, neither unit has required any maintenance. Routine checks have revealed no signs of corrosion.

(Plume-Doom mist eliminators are manufactured by Schuyler Manufacturing Corp., 84 Porete Avenue, North Arlington, N.J.)

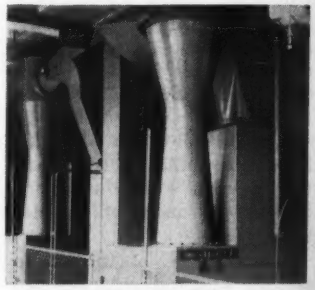
Check 3302 opposite last page.

▶ A NEW SOLUTIONS ARTICLE

Dusty chemical trapped by twin scrubbers at Betz Labs

Units have no moving parts, serve four blenders

Problem: An irksome dust situation was created by the dry mixing of over 60 powdered chemicals in more than



Ejector-venturi, wet-type scrubbers are capable of removing over 95% of 20-micron particles

2000 combinations at Betz Laboratories Incorporated, Philadelphia industrial water consultants. Most of the dust emanated from four blenders. Dust escaping from them discharged into the plant's atmosphere, causing the annoying condition.

Solution: Engineers redesigned the existing dust collecting system and installed two wet-type scrubbers. Units have no moving parts and are able to collect gases and small particles simultaneously. Recovery efficiencies with particulate sizes of 20 microns average above 95% (single-

stage operation) at water nozzle pressure of 40 to 60 psi.

At Betz, dust is collected at each of the four blenders and blown to one (depending upon formulation) of the two scrubbers. Water enters unit's scrubchamber through a nozzle. This creates a draft, which further entrains the dust and brings it into intimate contact with the water spray.

Dust and spray fall into scrubber box. Clean air is discharged to atmosphere. Similar units of this kind are available in various sizes up to 60". Scrubbers can handle as little as two, or as much as 73,500 cfm, without blowers.

Results: The annoying dust situation that existed previously in the plant has been eliminated. In operation for more than six months, the scrubbers are efficiently clearing atmosphere of minute particles. Working conditons are excellent.

(Further information about SK-4010 ejector-venturi scrubbers may be obtained from Schutte and Koerting Company, Dept. JA-29, Cornwells Heights, Bucks County, Pennsylvania.)

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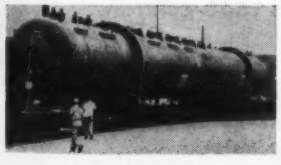


Jumbo horizontal reactor

. . . is one of three scheduled for installation at the Whiting refinery of American Oil Company (formerly Standard of Indiana). Unit covers three flatcars, has 12 ft diam at narrowest girth and weighs 160 tons. The reactors are part of a new alkylation unit that will produce high-grade blending stocks from refinery gases at rate of 12,000 bpd.

(Reactor was manufactured by Graver Tank & Mfg. Co., division of Union Tank Car Company, 4809 Tod Avenue, East Chicago, Indiana.)

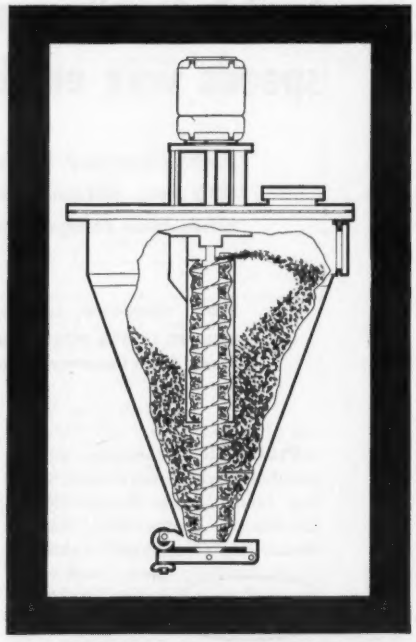
Check 3304 opposite last page.

IMPORTANT, NEW design in MIXERS

TUR-BLEND...SIMPLE, HIGHLY EFFICIENT DESIGN BY G-B

TUR-BLEND is a new and important design in mixers, combining many desired features in one mixer. The TUR-BLEND unit is stationary, compact, simple efficient, and flexible, and can be made in a wide range of capacities.

- **STATIONARY**... TUR-BLEND does not whirl, no safeguards are required.
- **COMPACT**... The TUR-BLEND is hardly bigger than the size of the load you mix.
- **SIMPLE & EFFICIENT**... Simple operation with a minimum of moving parts.
- **FLEXIBLE (1)**... The vessel and central tube may be jacketed for heating or cooling operations.
- **FLEXIBLE (2)**... The vessel may be enclosed for vacuum-drying of free flowing materials.
- **CAPACITIES**... Sizes: 24" to 96" diameters; and volumes: 2 to 185 cubic feet.



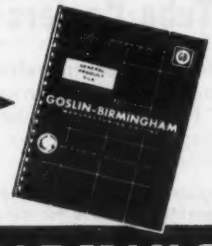
◀ Here's the way this new mixer blends together particles or solutions simply, safely and efficiently.

The new TUR-BLEND is a vertical vessel with an internally and centrally positioned material lifting screw. Its turbo-type dispersing blades briskly distribute particles at the top, with subsequent gravity flow to the bottom, where the lifting cycle is rapidly repeated. Blended material may be quickly discharged through the bottom outlet.

Write or call us for more comprehensive information on the new G-B TUR-BLEND.

CONSULT G-B FOR LABORATORY TEST DEMONSTRATION

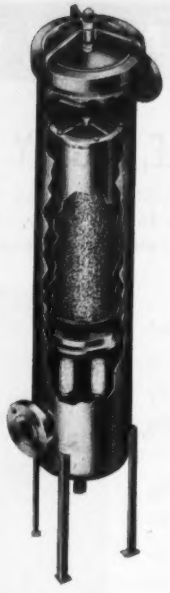
Ask for G-B "Facts and Figures" ▶



GOSLIN-BIRMINGHAM
MANUFACTURING COMPANY, INC.
P. O. BOX 631 / BIRMINGHAM ALA.

Check 3305 opposite last page.

The problem of oil vapor . . . and how to solve it!



Chemical and pharmaceutical manufacturers, petroleum refiners, food processors and users of pneumatic instrumentation . . . all encounter critical procedures wherein hydrocarbon vapors in compressed air and process gas streams produce adverse results.

The Selas VAPE-SORBER®, effectively combining principles of liquid-gas separation and high capacity oil adsorption, completely removes hydrocarbon vapors, dirt and liquid-phase entrainment. Compact, welded steel construction . . . no moving parts . . . minimum maintenance.

Typical VAPE-SORBER uses include:

- Aeration and agitation of liquids
- Air-cleaning of containers
- Protection of desiccants for dehydration

Send for free copy of new VAPE-SORBER Booklet No. 104, which permits selection of exact size and model for your requirements.

VAPE-SORBER is a registered trademark of Selas Corporation of America.

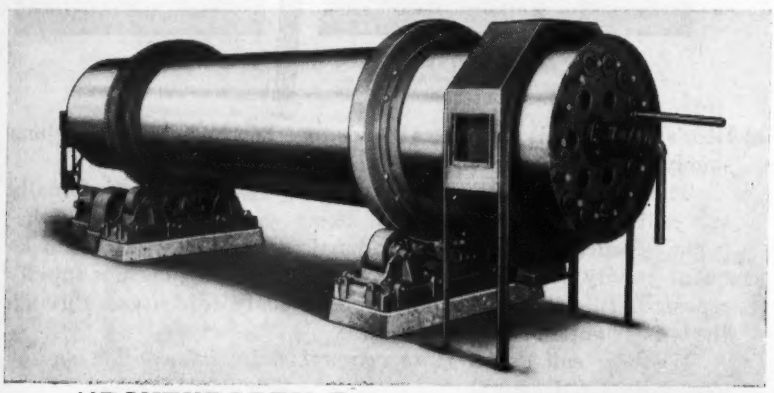
SELAS

Flotronics

Spring House, Pa.

A Division of Selas Corporation of America

Check 3306 opposite last page.



"DAVENPORT" Rotary Water Tube Coolers

Positive and effective cooling ahead of packaging, storing or further processing. "DAVENPORT" Rotary Water Tube Coolers are the undisputed answer to many cooling problems.

Let our engineers consult with you on your Pressing, Drying and Cooling problems or send for our catalog C. For quick reference consult your Chemical Engineering Catalog.

DAVENPORT MACHINE AND Foundry Company

A DIVISION OF MIDDLE STATES CORPORATION

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DAVENPORT

PRESSING – DRYING and COOLING Equipment

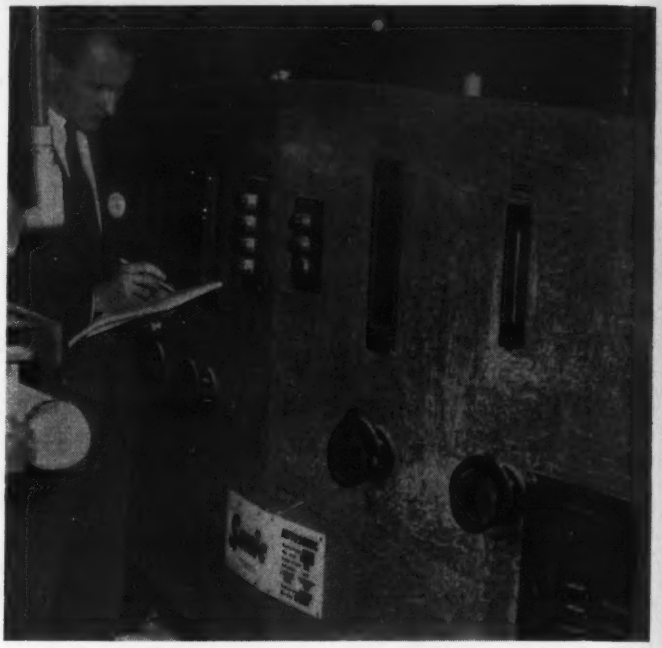
Continuous DeWatering Presses

ROTARY DRYERS Steam Tube, Hot Air and Direct Fire

Atmospheric DRUM DRYERS

ROTARY COOLERS Water and Air

Check 3307 opposite last page.



Instruments and lights on front of cabinet indicate status of processing at all times

Switch to ultrasonics speeds wax emulsion process

High-frequency homogenizer operates at 22,000 cps, automatically proportions and combines four components at 1500-gph rate

TED F. MEINHOLD, Associate Editor

with **MR. EDWIN WALDMAN,** Project Leader, Research Division

Keyes Fibre Company, Waterville, Maine

Problem: Preparing wax emulsion was a slow and tedious operation at Keyes Fibre Company, Waterville, Maine. Batch size was 50 gal; extreme care was required to overcome the inconsistencies inherent in small batch processing.

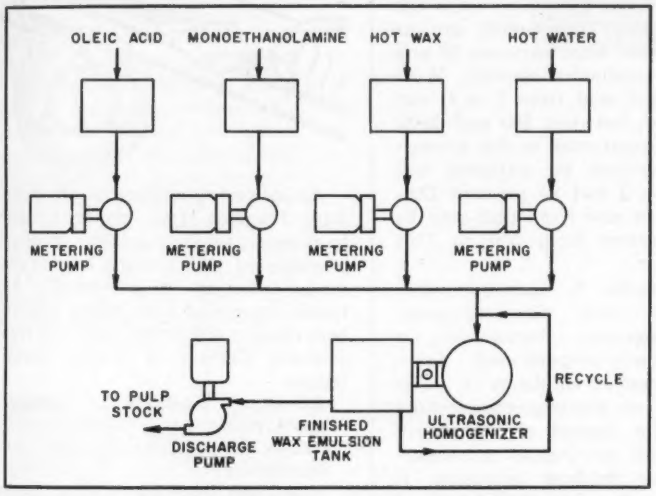
A NEW SOLUTIONS FEATURE

The emulsion is used as a sizing for pulp subsequently made into paper plates and cups. Mixture consists of four components: Oleic acid and monoethanolamine — the emulsificants — plus wax and water.

Ingredients were weighed and combined manually in a small, heated tank equipped with an agitator. First wax and water were added at about 200°F. The emulsificants were interjected next. The entire mass was then intensively mixed until size of the suspended particles dropped to one or two microns. Finished emulsion was transferred, hot, to a batch of pulp stock.

Solution: Early in 1960 the plant converted a large portion of its operations from

Homogenizer, proportioning pumps and other auxiliary devices are all located inside a cabinet-type mounting. Unit is designed for maximum compactness and easy accessibility



Simplified diagram illustrates how metering pumps feed four components into the ultrasonic homogenizer (bottom)

batch to continuous processing. To prepare the wax emulsion — and also inject it automatically into a continuous stream of pulp stock — company installed a highly efficient, combination proportioning-homogenizing unit.

Using ultrasonics, the machine is capable of rapidly producing large volumes of finished emulsion. Auxiliary pumps, control valves and flow indicators permit any number of ingredients to be accurately proportioned into a finished emulsion. All of the equipment is located inside a cabinet-type mounting, designed for compactness and easy accessibility.

With the new processing arrangement, hot wax is stored in 10,000-gal heated vats. Emulsificants are held at room temperature in 50-gal tanks. Water is obtained directly from plant's main supply, via a heat exchanger.

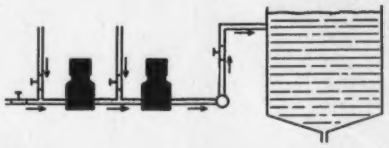
The equipment draws from the supply sources at whatever rate is desired. Each liquid flows into its own balance tank, from which it is transferred to the homogenizer by metering pumps operated by variable-speed drives. Flow rates are set and measured by means of instruments mounted on front of the cabinet. Lights

NEW

SHEAR-FLOW

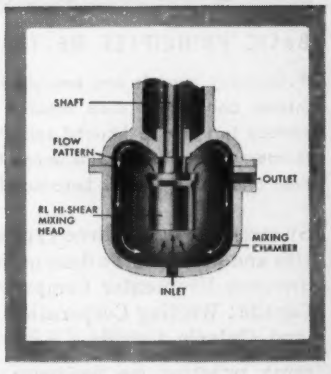
CONTINUOUS MIXER

Finer, faster blending for in-line processing



- **CUT PROCESSING COSTS:** This compact and completely self-contained unit conserves space, eliminates large mixing and paddle tanks, speeds up pipe line processing, handles high viscosity material in a minimum of time and conveniently lends itself to systems requiring jacketed heating or cooling.
- **ELIMINATE COSTLY EQUIPMENT:** Incorporating the same design principle as the portable SHEAR-FLOW, the new continuous mixer is capable of mixing any liquid that can be pumped, with results better than or comparable to that of equipment costing considerably more.
- **VERSATILE ADAPTABILITY:** More than one unit can be installed in series or in tandem along the route of flow. The new continuous SHEAR-FLOW can also be mounted either vertically or horizontally.
- **HI-SHEAR HEAD:** The unique Hi-Shear Head with dual impellers and stationary stators creates a high turbulence and concentrated shearing action that results in finer, faster blending, homogenizing, emulsifying or dispersing. Mechanical shear is achieved through close tolerances between impellers and stators.
- **SIZE RANGE:** The new SHEAR-FLOW can be powered with motors ranging from 1 to 10 horsepower depending on the power requirement demanded by the application.

Write for free Bulletin No. RL-200



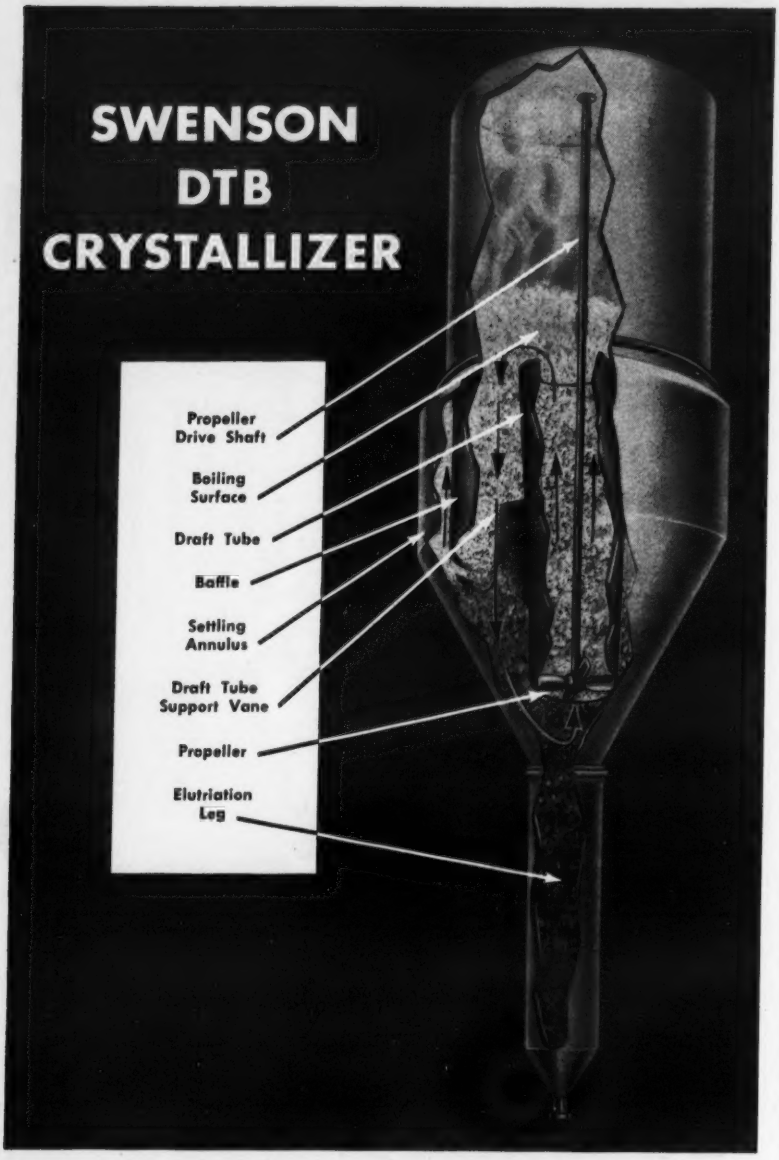
SHEAR-FLOW

GABB SPECIAL PRODUCTS INC.

GABB SPECIAL PRODUCTS INC.

Windsor Locks, Conn.

Check 3308 opposite last page.



BASIC PRINCIPLES OF THE DRAFT TUBE BAFFLE CRYSTALLIZER

• Growing crystals are brought to boiling surface where super-saturation is most intense and growth most rapid • Sufficient seed surface is maintained at boiling surface to minimize harmful salt deposits on equipment surfaces • Low head losses in internal circulation paths permit large flows at low power requirements • Optimum fines removal is possible because of high flow-rate past separation zone

Swenson designs three types of DTB Crystallizers — Cooling, Evaporative and Reaction. To determine the one best suited to *your* needs, write to: Swenson Evaporator Company, 15667 Lathrop Ave., Harvey, Illinois. In Canada: Whiting Corporation (Canada) Ltd., 350 Alexander Street, Welland, Ontario, Canada.

PROVED ENGINEERING FOR THE PROCESS INDUSTRIES SINCE 1889

SWENSON

A Division of WHITING Corporation

WHITING — MANUFACTURERS OF CRANES; TRANBEAM® HANDLING SYSTEMS; PRESSUREGRIP; TRACKMOBILES,® FOUNDRY, AND RAILROAD EQUIPMENT

Check 3309 opposite last page.

indicate status of processing at all times.

The homogenizer uses the fluid-dynamic forces of the liquids themselves to produce the sound waves. Fluids are impinged at 200-300 psi, by means of a small, stainless-steel gear pump, on the edge of a razor-thin blade about 1" thick. The device is mounted between two prongs and closely resembles a tuning fork.

The high-pressure jet stream causes blade to vibrate at about 22,000 cps. Cavitation takes place continuously as the liquid rushes past the blade, causing violent pressure changes to be generated. These are immediately put to work in the fluids, resulting in rapid and complete emulsification.

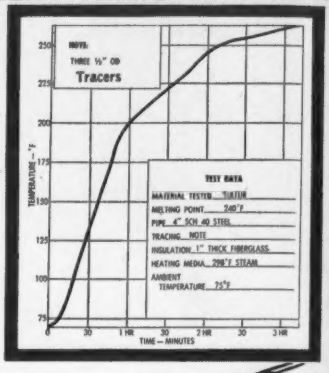
Normal gph flow rates for the four components are as follows: Wax, between 30 and 110; monoethanolamine, ¼ to 1; oleic acid, from 1 to 4; and water, between 500 and 1500. Retention time in the homogenizer can be adjusted between 3 and 30 seconds. Discharge rate from unit may be controlled from 350 to 1500 gph.

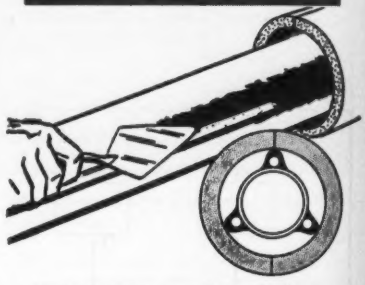
Results: In operation since June 1960, the ultrasonic homogenizer turns out a precisely-proportioned, four-component emulsion at a fast rate — thereby contributing to the success of the plant's overall continuous process.

The finished emulsion is currently consumed at about 17,500 gal per day. The homogenizer intermittently produces up to 1500 gph. It will automatically match itself to any drawoff rate below its maximum capacity while keeping proportions at their exact ratio. Tests have shown that the emulsion is more uniform and stable than that produced by the old method. As a precautionary measure, and since the machine plays a vital role in the plant's overall operations, standby pumps are maintained. A regularly scheduled inspection program is also conducted.

As for the machine's power requirements, this has been found to be approximately five kilowatts per hour. Ac-

Sulphur Handling is No Problem with THERMON HEAT TRANSFER CEMENT





An increasing number of plants are using Thermon Heat Transfer Cement to eliminate sulphur handling problems encountered with internal tracing and steam jacketing. A non-metallic adhesive compound with highly efficient heat transfer properties, Thermon Heat Transfer Cement in sulphur installations

Eliminates misfitting of prefabricated pipe
Eliminates possibility of cross contamination
Eliminates need for stuffing boxes and packing glands
Reduces cost of installation by *at least one-half*
Reduces maintenance costs

Thermon has been used successfully on pumps, valves and pilot plant and other equipment in sulphur service. Investigate the problem-solving and money-saving properties of Thermon, the *proved* solution to heat transfer problems.

Write for Thermon Bulletin 300.

THERMON

THERMON MANUFACTURING CO.

1017 Rosine • P. O. Box 1961
Houston, Texas

Check 3310 opposite last page.

cording to manufacturer, this figure represents substantially lower power consumption than any other conventional technique used to obtain the same results.

(Further information about Autosonic homogenizers may be obtained from Sonic Engineering Corporation, 146 Selleck Street, Stamford, Connecticut.)

Check 3311 opposite last page.

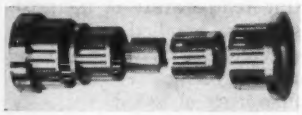
All in one operation — Pump mixes, blends and emulsifies

Uses: Mixing, blending, emulsifying and pumping wide range of products.

Features: Shear pump processes and transfers material at same time. Production-size unit can handle up to 200 gpm.

Description: Machine consists of a series of rotors and stators. These may be varied in any number of combinations depending upon processing requirements. External appearance of unit is quite similar to conventional centrifugal pump.

Particle size of processed material is determined by holdup time within unit. This can be controlled by manipulating valve on outlet line. Shear-pump operates smoothly and without vibration. There is virtually no heat gain in product being handled.



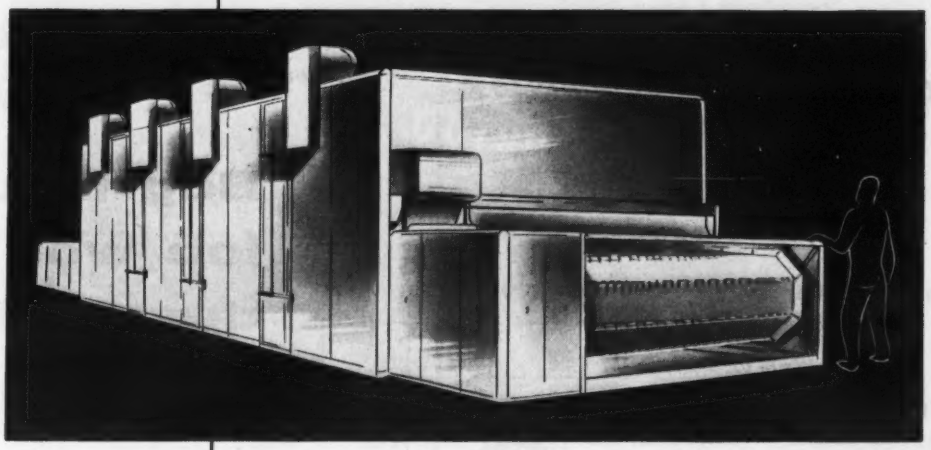
Key components of shear pump are rotors and stators, shown in this exploded view

Wide range of rotors are available, including single, double or triple-stage units. Device may be quickly disassembled or cleaned in place. Sanitary design permits use in pharmaceutical and food fields.

(Further information about shear pump may be obtained from Hobam Incorporated, P.O. Box 91-139, Buffalo 17, New York.)

Check 3312 opposite last page.

THIS IS **"NATIONAL"...**



The science of drying engineered to the highest efficiency and productivity in an APRON CONVEYOR DRYER for processing a wide variety of products . . . chemicals, pharmaceuticals, synthetic fibres, hair, rubber crumb, starch, foods, etc.

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"NATIONAL" Guarantees *Greater Value*—through:

- A thorough analysis of your drying problem by a team of experts.
- The use of proven standards integrated with prescribed design.
- Personal attention, from initial proposal to proven performance.
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FORTY-FIRST YEAR • INSTALLATIONS AROUND THE WORLD

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for uniform results

in . . . **DRYING**
DEHYDRATING
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select

YOUNG BROTHERS OVENS and **DRYERS**

designed and built for individual product and process requirements

Batch and Conveyor Types up to 1000° F
Gas, Electric, Steam, Oil — Radio Frequency Power

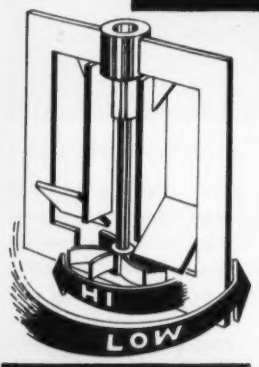
Write for Bulletin 157

YOUNG BROTHERS CO.
1825 Columbus Road • Cleveland 13, Ohio
Over 60 years of service

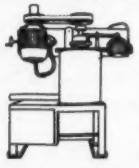
Check 3314 opposite last page.

New 3-D MIXER

DOUBLE-ACTING, COUNTER-ROTATING at Simultaneous HI-LOW SPEED DISPERSES, MIXES, EMULSIFIES



IF YOU MAKE... Roofing compounds, clay suspensions, rubber cement, cosmetics, printing inks, lithium grease, heavy adhesives, color suspensions, paper coatings, animal glues, carbon paper, or any other hard-to-mix, viscous material...



...investigate the Cleveland 3-D Mixer. This unique 6-blade high speed turbine in conjunction with closely placed, low-speed, counter rotating baffles, achieves up to 10,800 shears per minute.

Write today for complete specifications.

IN-PLANT RESEARCH SERVICE
We will place a Cleveland 3-D Mixer in YOUR plant to help you solve stubborn mixing problems.

Cleveland Mixer Co.
P. O. Box 197-B, Bedford, Ohio

Check 3315 opposite last page.

PROCESSING EQUIPMENT

PPC survey made of 354 chemical plants reveals that . . .

Bag failures are top woe of dust-collector users

YOU HAVE PLENTY of company — if you're being harassed with bag troubles on your fabric-type dust collector. According to a survey of chemical plants conducted recently by the research department of Putman Publishing Company, failures due to bag wear, bursting, tearing and rotting are the leading cause of operational breakdown for this kind of equipment.

The study was made in late 1960. Responses came from 354 installations. Out of these, 140 reported that they used automatic-cleaning bag-type dust collectors. One hundred and six operated with manually-cleaned units.

From the first group, half reported bag failures as the most frequent cause of breakdown. With the manually-cleaned machines, 37% claimed this difficulty. Cleaning-mechanism failures (automatic drive, traverse mechanism, shaker, reverse air, cleaning ring, vibrator) and bag blinding were named as runner-up culprits for the respective units.

Dry Units Most Popular

The survey revealed that among the plants using dust and fume control equipment, 95% have dry-type machines while 55% utilized wet-type devices. About half of the installations reported both dry and wet units.

The three most commonly used dry machines listed were cyclone separators, fabric-bag collectors with automatic cleaning, and bag collectors with manual cleaning. These were followed in order by electrostatic precipitators, gravity settling chambers, mechanically-operated centrifugal units, impingement separators and sonic precipitators.

Popularity of wet collectors was listed in this order: Spray chambers, packed towers, mechanically-operated centrifugal devices, and cyclonic, orifice and venturi-type scrubbers.

Peak Temperatures 80-200°F

In most of the plants surveyed, maximum operating temperature of the product streams being handled ranged between 80° and 200°F. However, one installation using cyclone separators reported a temperature of 1800°F.

It is interesting to note that four out of 10 plants with a fume or dust control problem purchased (or indicated that they intended to purchase) equipment to cope with the situation in 1960. These additions were liable to range from $500 to $500,000.

Majority of users reported that they purchase such equipment direct from a manufacturer, not through a contractor or as part of a complete process.

Requests for the need of such devices are most prone to originate with plant management or with the plant engineering or production departments. Manufacturers are likely to be invited to assist in preparing specifications in about ¼ of the plants.

(Based on survey, "Dust Collectors & Fume Scrubbers in Chemical Processing Plants," conducted by Research Department, Putman Publishing Company, 111 E. Delaware Place, Chicago 11, Illinois.)

Adds exact proportions of liquids to solids on continuous basis

Uses: Adding accurately controlled amounts of liquid to finely-divided material on a continuous basis.

Features: Liquid content can be controlled from a fraction of 1% up to any amount.

Description: Finely-divided material is introduced into distributing cone at top of unit. Product falls over the cone and leaves base in the form of a thin-walled (between ¼" to ⅜" thick) hollow cylinder.

System of sprays inside this cylinder applies liquid to the stream of falling material in such a way that all surfaces are fully coated. Treated product drops directly into chute, conveyor or into any other

Small unit shown here can process up to 340 lb per hr

processing unit. Material can also be discharged by means of a rotary table feeder, if desired.

Exterior construction is of heavy-duty stainless steel plate. Individual elements can be made of any alloy best suited for specific application. Access doors provide for easy cleaning. Standard units can process between 150 and 300,000 lb of material per hr.

(Verticone conditioner was developed by Johnson-March Corp., 1724 Chestnut St., Philadelphia, Pa.)

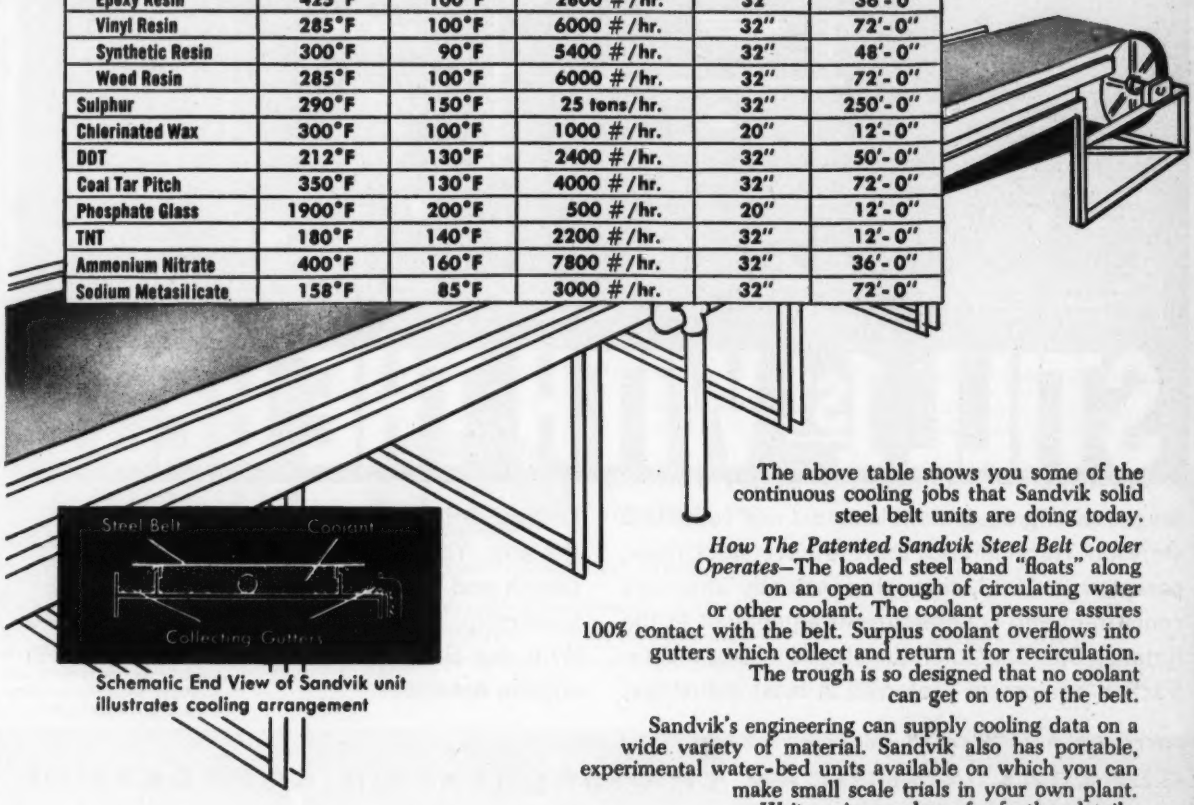
Check 3316 opposite last page.

For more information on developments in the section, check the Reader Service Slip.

Can you use this kind of Continuous Cooling capacity?

ACTUAL EXAMPLES OF SANDVIK STEEL-BELT COOLER OUTPUT

MATERIAL	FEED TEMP. F°	DISCHARGE TEMP. F°	CAPACITY	BELT WIDTH	COOLING LENGTH
Resins					
Weed Resin	450°F	130°F	5000 #/hr.	32"	120'-0"
Hydro Carbon Resin	400°F	100°F	6000 #/hr.	32"	84'-0"
Epoxy Resin	425°F	100°F	2800 #/hr.	32"	36'-0"
Vinyl Resin	285°F	100°F	6000 #/hr.	32"	72'-0"
Synthetic Resin	300°F	90°F	5400 #/hr.	32"	48'-0"
Weed Resin	285°F	100°F	6000 #/hr.	32"	72'-0"
Sulphur	290°F	150°F	25 tons/hr.	32"	250'-0"
Chlorinated Wax	300°F	100°F	1000 #/hr.	20"	12'-0"
DDT	212°F	130°F	2400 #/hr.	32"	50'-0"
Coal Tar Pitch	350°F	130°F	4000 #/hr.	32"	72'-0"
Phosphate Glass	1900°F	200°F	500 #/hr.	20"	12'-0"
TNT	180°F	140°F	2200 #/hr.	32"	12'-0"
Ammonium Nitrate	400°F	160°F	7800 #/hr.	32"	36'-0"
Sodium Metasilicate	158°F	85°F	3000 #/hr.	32"	72'-0"



Schematic End View of Sandvik unit illustrates cooling arrangement

The above table shows you some of the continuous cooling jobs that Sandvik solid steel belt units are doing today.

How The Patented Sandvik Steel Belt Cooler Operates—The loaded steel band "floats" along on an open trough of circulating water or other coolant. The coolant pressure assures 100% contact with the belt. Surplus coolant overflows into gutters which collect and return it for recirculation. The trough is so designed that no coolant can get on top of the belt.

Sandvik's engineering can supply cooling data on a wide variety of material. Sandvik also has portable, experimental water-bed units available on which you can make small scale trials in your own plant. Write, wire or phone for further details.

SANDVIK STEEL, INC. *Steel Belt Conveyor Department*

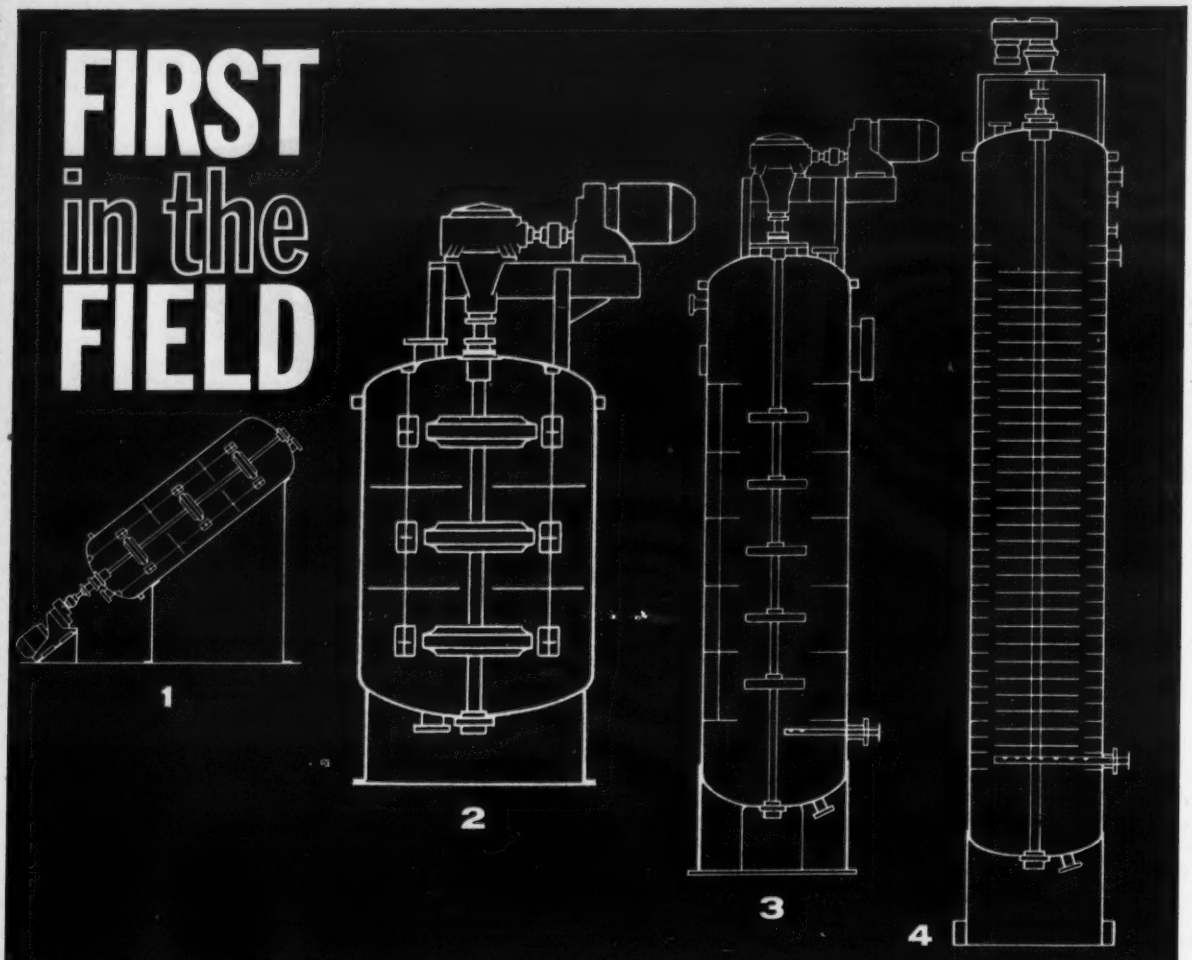
1702 Nevins Road, Fair Lawn, N. J. SWarthmore 7-6200
Branch Offices: Cleveland, Detroit, Skokie, Ill., Los Angeles
IN CANADA—Sandvik Canadian Ltd., P.O. Drawer 1335, Sta. O, Montreal 9, P. Q.
Manufacturers of Steel Belt Conveyors For Over 40 Years

SANDVIK STEEL BELT CONVEYORS

55-171 R

Check 3317 opposite last page.

FIRST in the FIELD



1 First staged mixer (1933) supplied to industry. Designed and built by Turbo-Mixer.

2 Standard 3 stage concurrent mixer, supplied by Turbo-Mixer since 1935.

3 Concurrent or countercurrent Turbo-Mixer reactor built in any size or number of stages.

4 RDC* column built by Turbo-Mixer. Latest word for countercurrent extraction.

STILL 1st WITH THE BEST

Staged mixing equipment is an old and continued story with Turbo-Mixer. From the first staged mixer, patented in 1933, through constantly improved concurrent and countercurrent equipment to the Rotating Disc Contactor, the staged mixing and extraction equipment preferred in most industries, General American's Turbo-Mixer Division has led the way. You may be sure General American research and industrial knowhow will maintain this leadership.

Write for Bulletins #T-11 and #T-1159 for descriptive details!

Process Equipment Division—Turbo-Mixers

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle Street
Chicago 3, Illinois

TURBO-MIXER GENERAL AMERICAN TRADE MARK

Offices in principal cities

*Patented

Check 3318 opposite last page.

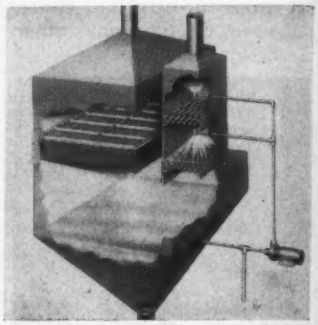
Efficiencies up to 99% obtained by scrubber with no moving parts

Uses: Removing dust and fumes from air and gas streams.

Features: Low-cost scrubber has no moving parts, dust recovery efficiency is up to 99%.

Description: Wet-type collector uses water spray over stainless steel screening to entrap impurities. Discharged air may be recirculated or released to atmosphere, as desired.

Water consumption is as small as one gpm per 1000 cfm of air. Pressure drop of air entering system is also low, minimizing power requirements. Unit's self-cleaning feature permits continuous operation with little, if any, maintenance. Scrubbers are available with capacities up to 50,000 cfm.



Drawing shows scrubbing action used by scrubber to remove impurities

(L-S air scrubber is manufactured by Antipol Corp., 407 Hill Arcade Bldg., Galesburg, Ill.)

Check 3319 opposite last page.

No mix tanks necessary with high-shear action pipeline mixer

Uses: Unit is capable of mixing any liquid that can be pumped.

Features: Compact, self-contained unit can be mounted directly in pipeline, conserving space and bypassing need

To page 72

THAT'S INTERESTING

Forecasting by computer

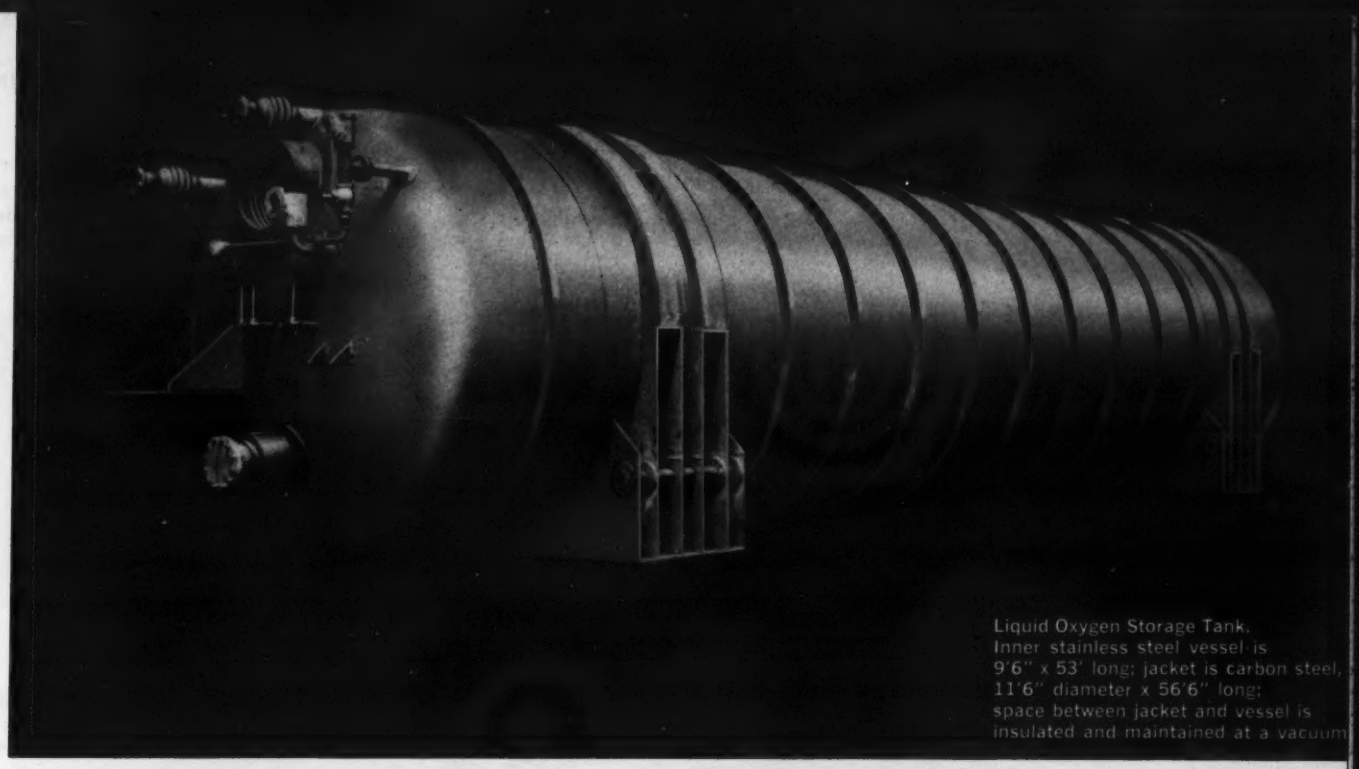
Television set sales are being forecast for RCA using techniques employed in the RCA 501 electronic data processing system to project accurately on election night the election of John F. Kennedy. Previously calculated in longhand, the simplest task took a man two days of steady figuring. The computer does the two-day problem in one minute.

Air cleared

Refineries contribute 90 tons/day of hydrocarbons to Los Angeles County's air pollution picture—a modest showing in comparison to automobiles which add 1500 tons/day.

This 90 ton/day figure for refineries represents a cut in hydrocarbon output of 13 tons/day as compared to previous year.

For more information on product at right, specify 3320 see information request blank opposite last page.



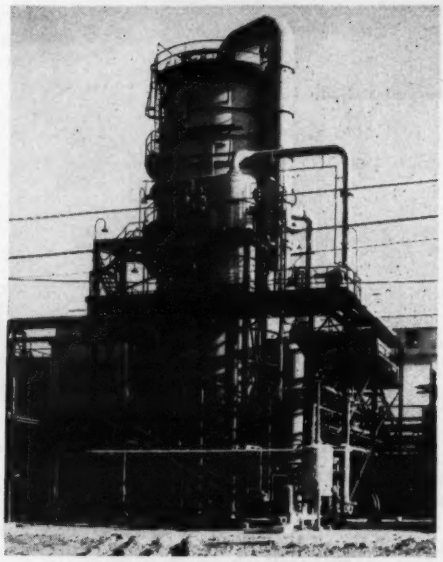
Liquid Oxygen Storage Tank. Inner stainless steel vessel is 9'6" x 53' long; jacket is carbon steel, 11'6" diameter x 56'6" long; space between jacket and vessel is insulated and maintained at a vacuum

STRUTHERS WELLS ENGINEERED EQUIPMENT

serves the nation's leading processing industries

Whether you require standard or specialized processing equipment, it pays to select the latest designs. Here are a few examples from today's modern, diversified product line designed and fabricated by Struthers Wells. The results, again and again, have been improved product, increased production and lower overall costs. Your company may also benefit by taking advantage of Struthers Wells' more than 100 years of experience in the engineering and manufacturing of process equipment.

For additional information and address of your local Struthers Wells representative, see Chemical Engineering Catalog, pages 1523 to 1542.



Towering almost seven stories, this Krystal crystallizer produces premium grade ammonium sulfate.

Struthers Wells

STRUTHERS WELLS CORPORATION

WARREN, PA. **Plants at Warren and Titusville, Pa.**

PROCESSING EQUIPMENT DIVISION

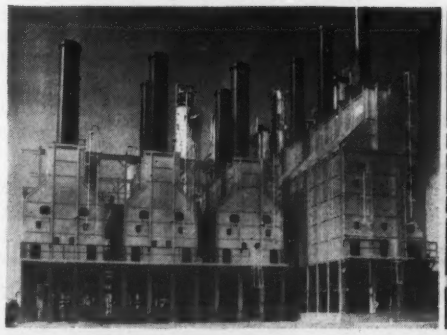
Crystallizers . . . Direct Fired Heaters . . . Evaporators . . . Heat Exchangers . . . Mixing and Blending Units . . . Quick Opening Doors . . . Special Carbon and Alloy Processing Vessels

BOILER DIVISION

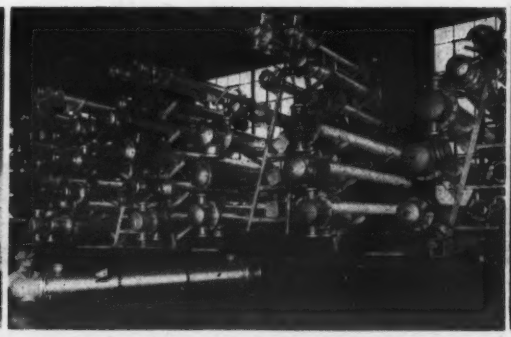
BOILERS for Power and Heat . . . High and Low Pressure . . . Water Tube . . . Fire Tube . . . Package Units

FORGE DIVISION

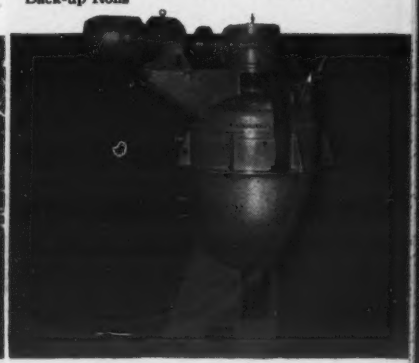
Crankshafts . . . Pressure Vessels . . . Hydraulic Cylinders . . . Shafting . . . Straightening and Back-up Rolls



Four heaters, temperatures to 1450°F., serve Texas petrochemical plant.



Standardized heat exchangers available in sizes to 1200 square feet.



"Multi-Action" mixer with specially designed radial propeller

KENNEDY Coke-calcining Kilns

Mountaineer Carbon Company achieves higher yields and better quality at their new Cresap, W. Va. coke-calcining plant—with a KENNEDY Kiln and KENNEDY Kiln Accessories.

Reprinted from Chemical Engineering, copyright 1958, McGraw-Hill Publishing Co., New York, N.Y.

Mountaineer averages better than 75% yield, several percentage points higher than older installations. And the coke is more uniform in density.

Mountaineer gains these advantages through close control of combustion. A single gas-fed burner in hood at discharge end of kiln generates a temperature of about 2,500 F. Flame configuration, primary and secondary air flows are all controlled carefully; seals cut leakage of unwanted air.

This close control of combustion allows some burning of cracked gases from coke bed. Yet, it prevents unwanted combustion of carbon which reduces yields in most coke calcining. Too, it produces uniform density in finished product, a direct result of uniform temperature.

Kiln is 180 ft. long and 10.5 ft. in dia. Rotating at about 1 rpm., it retains coke approximately 100 min.

KENNEDY equipment is behind the high performance record of this new plant:

- The 180' long kiln with its bronze sleeved, self-aligning bearings, 3-tire supports and drive assembly;
- Special feed and discharge air seals which reduce air leakage and improve combustion control;
- The kiln firing hood with its extra large access doors for maintenance;
- The air cooled nose ring assembly, specially designed by KENNEDY for coke-calcining.

When you are in need of kilns—for lime, calcined coke, dead burned dolomite, cement by wet or dry process, nodulizing and agglomerating or drying—consult KENNEDY. You can be assured of quality equipment that delivers high, long-lasting performance.

KENNEDY VAN SAUN
MANUFACTURING & ENGINEERING CORPORATION
405 PARK AVENUE, NEW YORK 22, N.Y. • FACTORY: DANVILLE, PA.

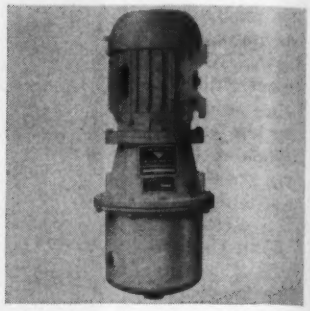
Primary & Secondary Gyratory Crushers • Jaw Crushers • Roll Crushers • Impact Breakers • Hammer Mills • Ball, Rod & Tube Mills • Rotary Kilns • Dryers • Preheaters & Coolers • Complete Cement & Lime Plants • Pneumatic Conveying Pumps • Air Activated Conveyors • Complete Pneumatic Conveying Systems • Pulverized Coal Gas Oil Firing Systems

Check 3321 opposite last page.

From page 70

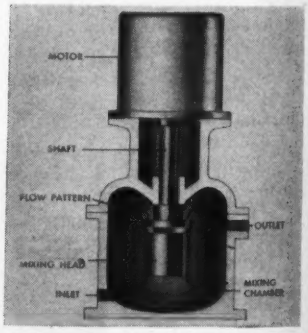
for extra mixing tanks.

Description: Mixer is specifically designed to provide high shear action in continuous operation. Small mixing head is enclosed in a sealed chamber that contains inlet and outlet for passage of product being processed.



Mixer fits directly into pipeline, saves space

Since unit is completely sealed, possibility of air entrainment is eliminated, thereby making device suitable for use on pressure systems, conversion applications and for adding gases to liquids. Mixer can handle inflammable materials with safety.



Mixing head is enclosed within a sealed chamber, eliminates possibility of air entrainment and permits processing of inflammable materials

Size and capacity are dependent upon specific requirements. Unit may be powered with motors ranging from one to 10 hp.

(Shear-Flow continuous mixer is product of Gabb Special Products, Inc., Windsor Locks, Connecticut.)

Check 3322 opposite last page.

THAT'S INTERESTING

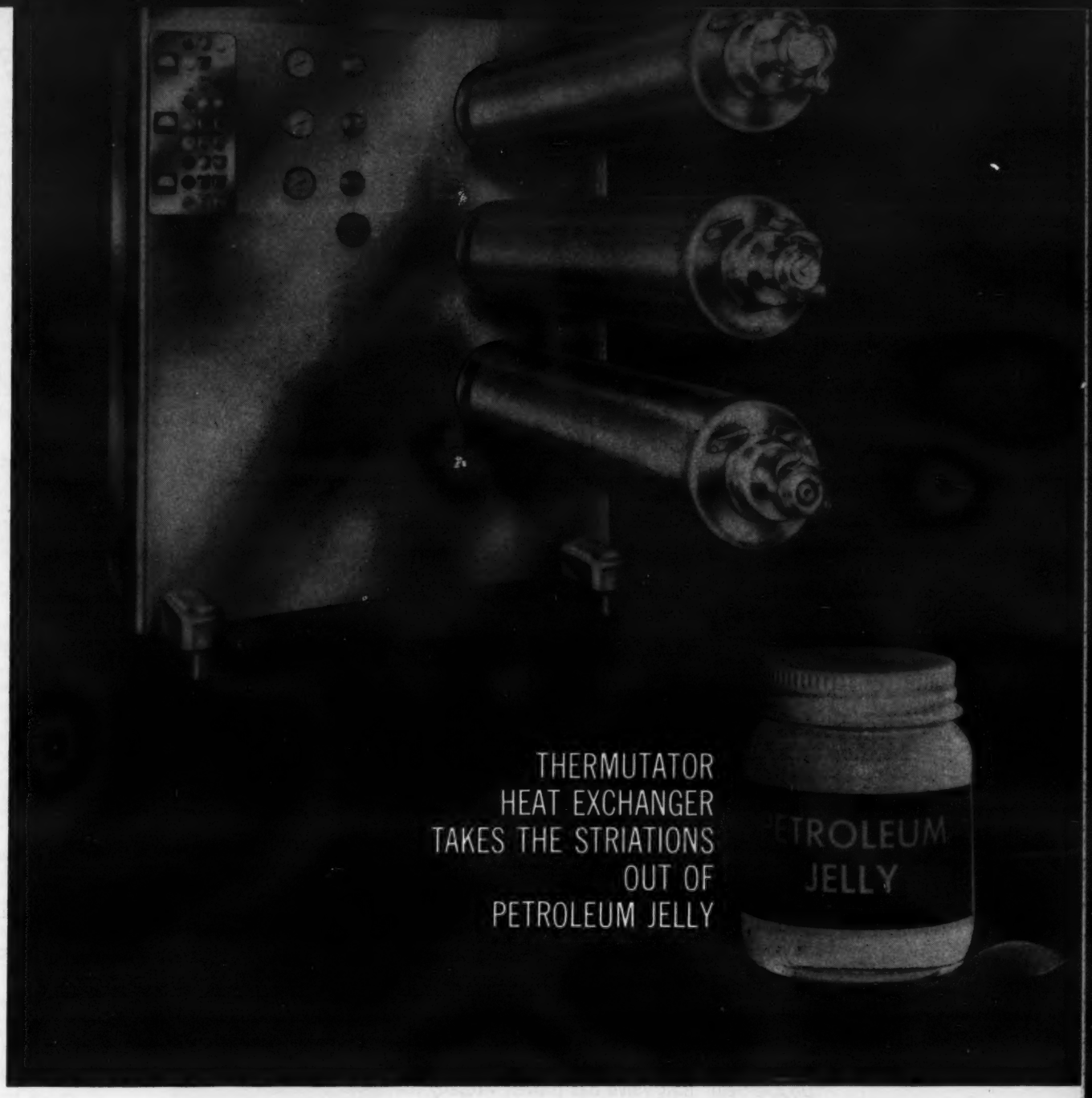
Six kinds of colds

Each person in an urban family averages 4.7 colds a year! These coupled with suburban and rural colds, add up to 500 million colds each year. Each infected person is disabled on an average of one to two days per cold, costing the economy $2 billion. There are six kinds of colds: simple cold, rarely accompanied by fever; severe cold, victim "knocked out"; painful cold, persistent headache and muscular pain; complicated cold, victim susceptible to secondary infections; coughing cold; and child's cold.

Nickel use at new high

Increased use of nickel in Europe during 1960 is expected to push total nickel consumption up 15% to a new high of 500 million lb. Canada and the U.S. used 2.5% and 43%; Europe 43.5%.

For more information on product at right, specify 3323 see information request blank opposite last page.



Cherry-Burrell Cures Those Jelly Row Blues

Product appearance can make or muff a sale as a large manufacturer of petroleum jelly discovered. His product lay in unappealing rows or layers of different textured jelly. He asked Cherry-Burrell if they could give his product more of a *togetherness* look, solve his Jelly Row Blues.

After studying his manufacturing process and running laboratory tests on the product, Cherry-Burrell engineers found the trouble. The manufacturer's previous equipment cooled too slowly and produced striations in the jar.

The engineers recommended a Cherry-Burrell Thermutator. Now the manufacturer has complete control over product temperature. And the Thermutator blades texturize the product, give it a smooth, uniform appearance. Sales picked up. And now the manufacturer whistles a happy tune. Why not? His petroleum jelly is a popular first choice everywhere.

Highly trained technicians will test your product without obligation in a Cherry-Burrell laboratory. They will show you how Cherry-Burrell food processing equipment can help you improve your operation and profit position. Your specialists are invited to participate in the testing. Call or write Cherry-Burrell today.

**Case history on request.*

Equipment for homogenizing, heating, cooling, flavorizing, storing, separating, freezing, mixing, packaging and conveying. Write for your free catalog.

CHERRY-BURRELL CORPORATION
CEDAR RAPIDS, IOWA

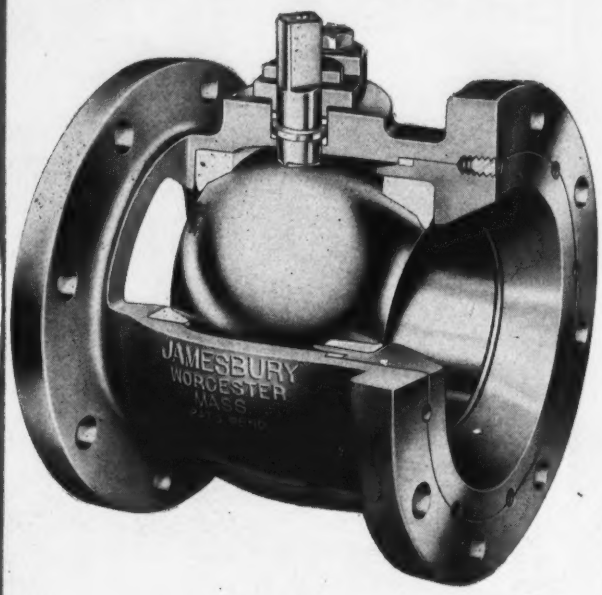
"Double-Seal"™

Outline for Successful Valving

jamesbury
BALL VALVES*
*PATENTED

As Versatile As Industry Itself!

"Double-Sure"



The words "Double-Seal" have delivered a new concept of valve dependability and performance. The exclusive "Double-Seal" design means complete shut-off on BOTH sealing surfaces of the ball. Because of this action the valve will hold pressure equally well in either direction.

In long term high-cycling through a wide variety of applications, the "Double-Seal" Ball Valve has proven virtually maintenance free.

For maximum leak-proof performance, full flow and easy quarter turn operation, the Jamesbury "Double-Seal" Ball Valve is a proven leader.

JAMESBURY CORP.,

64 NEW STREET, WORCESTER, MASS.

Send for Jamesbury's "At Your Service" Literature

MATERIALS:

Jamesbury "Double-Seal" Ball Valves are available in Types 303, 316 and Alloy 20 Stainless Steels, Carbon Steel, Bronze, Ductile Iron, Monel, Aluminum and PVC. Other materials on special order.

Interchangeable seats and seals are available in "Teflon", Nylon, Buna-N, Neoprene, Hypalon and natural rubbers.

Pneumatic, Hydraulic and Electric Motor Operators to fit Remote Control Requirements.

SIZES:

Screwed End: ¼" through 3". Flanged: 150# series — ½" through 12", 300# series — ½" through 8"*. *10" and 12" on application *600# series on application.

DISTRIBUTORS IN PRINCIPAL CITIES

804-Q © 1961 Jamesbury Corp.

Check 3324 opposite last page.

NEW LITERATURE

Processing Equipment

Four pages of charts and tables highlight 28-page booklet discussing use of stainless steel screens in chemical and allied industries. "Bee-Zee Screens" — Bixby-Zimmer Engineering Co.

Check 3325 opposite last page.

What the plant engineer should know about requirements for electrostatic precipitators is told in 11-page reprint of technical talk. Electrostatic Precipitator Article — Buell Engineering Co., Inc.

Check 3326 opposite last page.

Loose leaf catalog describes industrial wire cloth and screen. Weight conversion tables, sieve series, decimal equivalents and other reference data are included. Screen catalog — The Cleveland Wire Cloth and Manufacturing Company.

Check 3327 opposite last page.

NEXT MONTH

We'll give you the details of a major breakthrough in food-oil processing. Developed by Ranchers Cotton Oil Co., California, the refining process produces in a few short hours what it used to take days to achieve.

Fabric bags for dust collectors are considered in four-page bulletin. Table comparing properties of various materials is included. Bulletin 14 — The National Filter Media Corporation.

Check 3328 opposite last page.

Attrition mills and their uses are reviewed in reprint of 12-page technical article. Horsepower requirements and operating data are included. Reprint F-85 — Sprout Waldron & Company, Inc.

Check 3329 opposite last page.

Fluidics — defined as the science of fluid processes, is explained in 16-page bulletin. Processing equipment for various unit operations are described. 1961 Fluidics Buyers Guide — Pfaudler Division of Pfaudler Permutit Inc.

Check 3330 opposite last page.

Dielectric ovens, both batch-type and conveyorized, for baking, drying and curing all types of non-metallic materials are cataloged in Bul 60-E — Young Brothers Company.

Check 3331 opposite last page.

Guided tour through processing equipment manufacturer's plant may be taken via 16-page brochure which contains over 65 photographs. Bul 101 — Hardinge Manufacturing Company, subsidiary of Hardinge Company Incorporated.

Check 3332 opposite last page.

Wound-wire filter elements for chemicals, pharmaceuticals, condensate and other materials are described in eight-page brochure. Device can remove particles down to 1/10 of a micron. Complete filtration systems are illustrated. Clarite Filter Brochure — Croll-Reynolds Engineering Co.

Check 3333 opposite last page.

Equipment for blending and coating light and heavy solids such as feeds or grains with thick, sticky liquids (such as molasses) is discussed in four-page bulletin. Unit can handle up to 10 tph. Bul 11-60 — Prater Pulverizer Company.

Check 3334 opposite last page.

Line of attrition mills are illustrated and described in eight-page brochure. Dimensions, weights and other specifications are given. Bul A-560-A — Robinson Division, The Young Machinery Company, Inc.

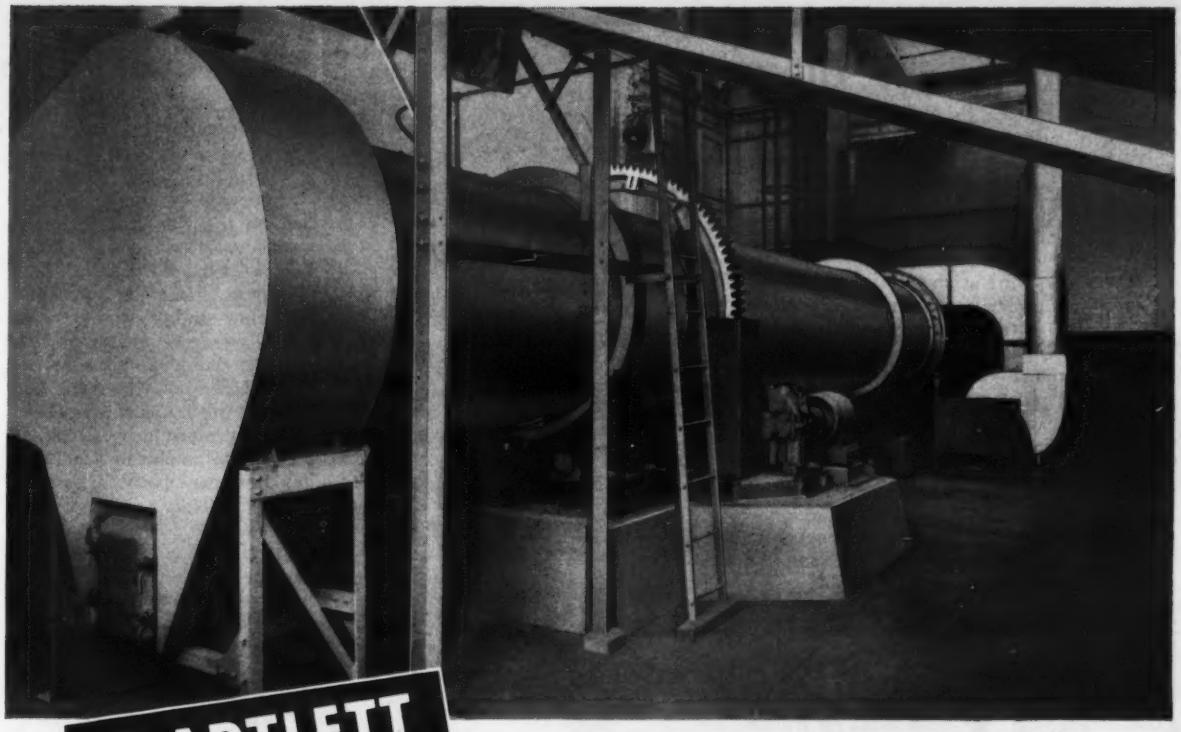
Check 3335 opposite last page.

Vibrating screen that uses patented underslung screen mounting which prevents "whipping" and "flexing" is depicted in four-page brochure. Units are custom-built to fit specific needs. Rumba-Screen Bul — Hutchison Manufacturing Company.

Check 3336 opposite last page.

"Of course I agreed to have a job analysis made —but . . ."

Henry Gaines Goodman, Union Carbide Chemicals



BARTLETT-SNOW
CLEVELAND 5, OHIO

ROTARY DRYERS

Indirect Steam Heated Dryer Processing a Plastic Material.

Indirect Heated Style "D" Dryer Processing Carbon Black.

Widely used for drying chemical salts, ores, carbon black, metallic oxides, pigments, plastics, fertilizers, catalysts, pharmaceuticals, clays and many other materials and products.

Parallel and counter-flow dryers; direct heat, indirect heat, indirect-direct heat and steam tube types including the one *best suited for your particular requirement.*

Complete laboratory facilities enable us to determine the retention time, permissible temperature, preferred velocities, and all other performance data for any treatment. We can even produce samples of the finished product before the production unit is built.

Our exacting design and fabrication assure accurately controlled product uniformity, and efficient, low cost, maintenance-free operation year after year, fully up to rated capacity. You'll find it pays to call the Bartlett-Snow heat processing engineers. Let us work with *you* on *your* next project!

DESIGNERS
ENGINEERS
FABRICATORS
ERECTORS

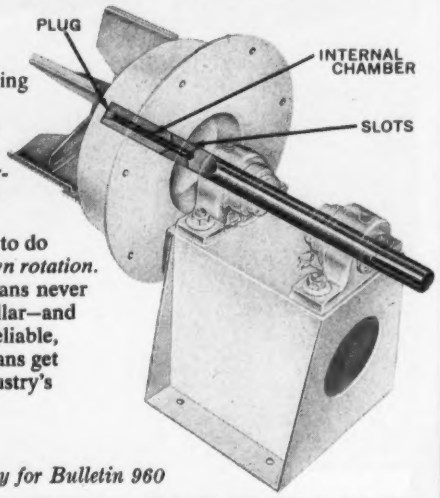
THE C. O. BARTLETT & SNOW CO.
6150 Harvard Ave., Cleveland 5, Ohio
DRYERS • COOLERS • CALCINERS • KILNS

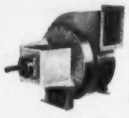
Bulletin No. 118 gives full details. Send for a copy Today.

Check 3337 opposite last page.

Here's Why Thermal-Aire Fans
NEVER GET HOT UNDER THE COLLAR!

You're looking at an Air-Cooled Shaft used in Thermal-Aire Fans. Featuring exclusive chamber-and-slot design, it keeps bearings cool . . . protects them against excessive heat, over-expansion and burn-out. It requires no water, slingers or other circulatory systems to do the cooling job . . . *just its own rotation.* That's why Thermal-Aire Fans never get hot under the bearing collar—and one of many reasons why reliable, dependable Thermal-Aire Fans get specified for so many of industry's critical, high-temperature air-moving jobs.





■ *Write today for Bulletin 960*

THERMAL-AIRE FANS

Garden City Fan & Blower Co., 803 N. Eighth St., Niles, Mich.

Check 3338 opposite last page.

At the Air Force Academy...

Sure PROTECTION

FOR THEIR HIGH-PRESSURE SYSTEM

Air Force Academy's extensive heating system is protected and silenced by Williams-Hager Check Valves which operate instantly when flow reversal starts or when flow is zero.

Williams-Hager **Silent CHECK VALVES**

WRITE FOR BULLETINS: No. 659 on Pressure Loss Tests . . . No. 654 on Valves . . . No. 851 on Cause, Effect and Control of Water Hammer

The WILLIAMS GAUGE CO., Inc.
146 Stanwix Street
2 Gateway Center • Pittsburgh 22, Pa.
Our 75th Year • 1886-1961

Check 3339 opposite last page.

Japan Chemical Industry *From page 27*

the following summary of developments to partly relieve this situation:

"Spurred by keen competition on the Far Eastern market recently by products from Europe, especially from West Germany, Japan's synthetic ammonia industry has just completed a modernization program in which a large amount of coke-water gas and electrolytic hydrogen has been partly replaced by a small amount of reformed natural gas but principally by crude-oil gasification.

"Now, the Japanese Government in collaboration with Japan's Ammonium Sulfate Association has launched another modernization program called the 'second five-year plan.' Under this plan, the 1960 total (ammonia) capacity for the nation is to be maintained through 1964 without increase, but a target was set so that, by the end of 1964, 94.5% of the ammonia will be made from crude or heavy fuel oil. Objective is to reduce manufacturing cost.

"Improvised oil gasification started in Japan about 1955 when they fed crude oil along with coal to Winkler and Koppers coal gasification generators. During following years the Fauser process of coal gasification (operated at about atmospheric pressure) was introduced, and by January 1959 four ammonia producers were using it. Currently in Japan the total installed capacity of the Texaco oil gasification process surpasses that of the Fauser process, with the Japanese Sumitomo process taking third place."

Looming as important from a raw materials standpoint is LPG brought in by tanker. A number of Japanese shipbuilders are evidencing interest in this.

Money Pinch

As with anyone's ambitious expansion program, an appropriate question is: Where is the money coming from? Several U. S. observers believe the Japanese can finance their program without outside help. But from all indications, the Japanese expect to get most of their needed funds for chemical and steel industry expansion from the United States. Reason: Prestige, interest rates are lower, and long-term obligations increasingly appear to be available.

All Not Rosy, However

Although Japan's emergence as an effective converter of chemical raw materials for world trade has been closely related to the United States through Occupation Government cartel reform policies and financial aid, the Japanese realistically expect changes that may slow their ambitious expansion program, according to Karel F. Mulder, International Consultant to The Lummus Company, New York:

"One of Japan's limiting factors is its almost total lack of facilities for market research. This is particularly frustrating to foreign companies when they try to investigate possibilities for ventures in that country. Planning by MITI is likewise impeded, with the result that the often reckless proposals by Japanese manufacturers are tempered by MITI without that organization having specific evidence of the amount of product that can actually be sold, nor the prices that will be paid for it.

"Another factor has to do with the Japanese businessman of today, who, though modern in regard to technology, is like every other Japanese citizen irrevocably enmeshed in obligations to his family, company, and Government.

"On the other hand, Japan's industry benefits by a liberal government depreciation allowances policy, plus tariff and sometimes even outright embargo protection for new manufacturers of products previously available by importation.

"Although it is no doubt true that in the foreseeable future Japanese Government restrictions may be lifted so that we may deal directly with individual companies, the traditional interrelationships are so firmly established in the

social structure that we shall still in reality be dealing with Japan as a whole.

"Dissolution of the Zaibatsu cartel interests by the Occupation Government did much to free the Japanese businessman to secure capital through public offerings never before available to the Japanese investing public, and to seek other needed support from Government agencies organized to aid industrial expansion.

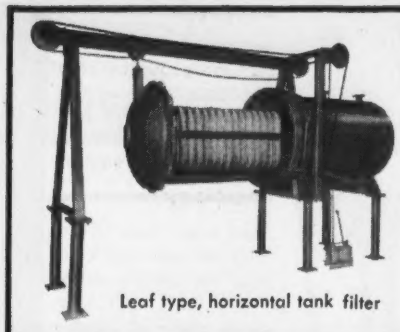
"In recent years, however, some traditional patterns have been re-emerging, and one of the interesting byproducts of re-combining of some firms has been an oversupply of white-collar workers, a factor that no doubt is having its toll on company efficiency."

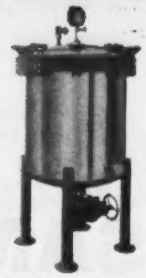
The United States gold problem is also raising concern among Japanese industrialists and orienting thinking towards their previous markets in Southeast Asia. *The Japan Stock Journal* of Jan. 30, 1961, said: "The save-the-dollar drive has raised prospects of intensified export competition on the world market and Japan's business world naturally sees a way out in possible trade with Red China." This was from a front-page article entitled "Japanese businessmen groping for trade with Red China."

Efficiency Logical Answer . . . but Not Only One

From the preceding, it can be seen that with such high energy and raw material costs and long distances to transport both raw and finished materials, Japan's dedicated people must rely on highest processing efficiency and modern control systems and devices to attract needed capital and produce the high-quality products at low enough prices to compete on the world market.

But, in addition to these aids, it would appear that there must be other ways of keeping costs down to a lower level than competition. What are these "other ways" and might they be financial? Is it that Japanese firms are undertaking their ventures with


Leaf type, horizontal tank filter


Leaf type, vertical tank filter

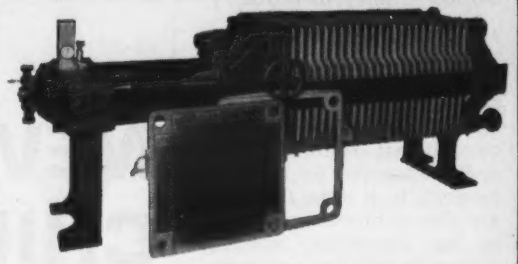
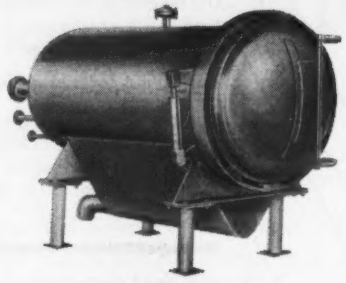
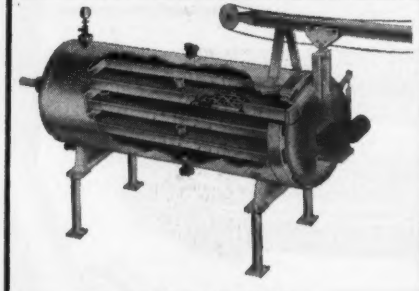


Plate and frame filter press

It's true—we build many types of filters


Rotary leaf type positive sluicing filter


Horizontal tray filter

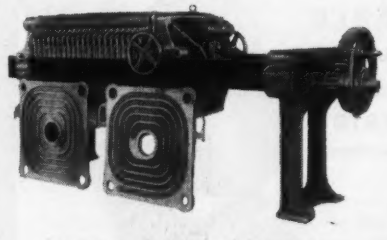
but primarily WE SELL FILTRATION

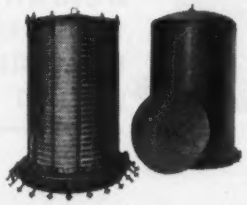
The array of Shriver filters you see here represents various types we design and build for the process industries. But—more important—the kind of filter we recommend for your requirements is based on our technical investigations and laboratory tests to determine what is best suited for optimum operating efficiency and economy. Sometimes these analyses indicate the need for a filter not of our manufacture, and we tell you so frankly.

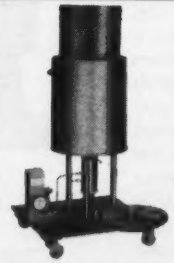
Such unbiased evaluations have helped build good will which our long experience has maintained at a high level.

That is why at Shriver's we try to "sell filtration," and the right filter for your process readily sells itself.

Let us work with you on your filtration improvement or expansion programs.


Continuous plate and frame slurry thickener and washer


Horizontal plate filter with hood type cover


Horizontal plate, tank type filter

Diaphragm pump for abrasive, corrosive materials

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T. Shriver & Company, Inc.

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Japan Chemical Industry

From preceding page

willingness to generate *less* capital internally, relying more on future credit while paying conventional stock dividends and interest rates for borrowed money? Is it also that they are able to function with fewer top executives, who are willing to take less remuneraton for their contribution towards establishing their nation's newest industry?

Mr. Mulder's reference to "enmeshment in responsibility" would suggest that, in a nation where the individual places a higher value on his peers' opinion of his accomplishments than on personal materialistic gain, such may be the case.

As anthropologist Ruth Benedict has put it*, "The Japanese define the supreme task of life as fulfilling one's obligations . . ." ■

*Suggested reading: Benedict, Ruth, "The Chrysanthemum and the Sword," Houghton Mifflin.

Building Overseas

From page 32

wages in most countries are specified. In some instances, automatic wage increases are provided.

Wages can be dependent upon the family status. In some countries the head of the family is paid more than others doing exactly the same job who have no family obligations. The eldest son may rate higher pay than a younger son. All these factors of family status must be taken into consideration.

Paid vacations and holidays for the hourly worker are the rule rather than the exception, just as in the U.S. It is usual to provide for a minimum of two weeks paid vacation. Paid holidays, in addition to vacation, can amount to eighteen days per year. In one country, the 1960 Christmas Holiday lasted from December 23 to January 3, with full pay for each worker!

In one country a paid vacation of *three months* is possible after twenty years service!

To next page

NEW CHIKSAN SPRING BALANCED LOADING ARM–

Self compensating spring tension provides complete balance at any position, regardless of position of outer leg. Tension is adjustable if required.

Steel arm is built to take constant use and handling. Top quality components and fabrication mean years of trouble-free service.

Compression spring assembly is fully contained in strong steel housing. Disassembly for inspection and servicing is readily accomplished.

Compact design. No dangerous protruding brackets or counterweights. Catwalk behind arm is free of obstructions.

Full pre-set stop adjustment at any angle in vertical plane.

FEATURING THE REMARKABLE TOTALLY ENCLOSED COMPRESSION SPRING DESIGN

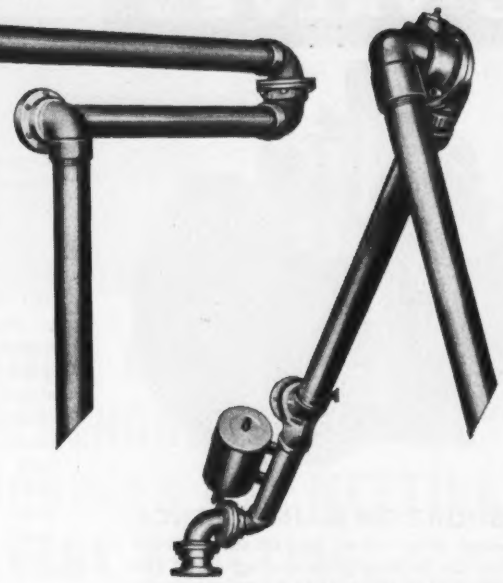
The Chiksan Spring Balanced arm can be readily installed in any existing terminal. Also, the arm can be modified in the field when more length or equipment is added to it, by the addition of more springs.

WANT TO CONVERT EXISTING EQUIPMENT?

Chiksan Base Arm Sections permit operators to change existing facilities with minimum effort. Base Arm Sections are available in standard sizes of 2", 3" and 4". Riser joint supplied with flanged or threaded connections as desired.

FOLDED ARM MODEL-DS

Standard Sizes: 2", 3", 4". This quality, heavy-duty arm for hard-to-handle chemicals features the versatile DS Series Swivel Joint described below. The swivel joint combination allows for reach to any point within working range from a minimum of 3-feet from riser pipe to a maximum of 11-feet in the two and three-inch arm and 9-feet in the four-inch arm.



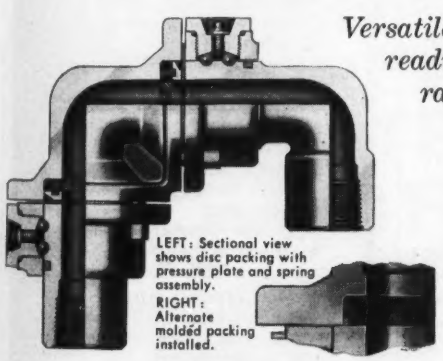
SLIDING SLEEVE MODEL-DS

Standard Sizes: 2", 3", 4". The sliding sleeve Chiksan arm for chemical service employs two DS swivel joints, one on the riser, the other at the drop pipe. The sliding sleeve is of aluminum and bronze construction with an asbestos seal. (Viton and teflon seals are also available.)

EFFECT FAST, SAFE HANDLING OF CHEMICALS AT YOUR LOADING TERMINALS

FOR TRUCK OR TANK CAR LOADING—

Here's a series of loading arms that measures up on every count. Check payout time. The Chiksan chemical service arms score excellent on minimum maintenance and long service life with little replacement attention. Check operating ease. There's finger-weight flexibility and the arm stays put during adjustment—doesn't creep or sag. Check versatility. With the DS series swivel joint you can, with proper packing, handle virtually any chemical your plant processes or ships. And when it comes to safety, the Chiksan chemical service loading arm has an unbeatable record. Get the facts. Write Chiksan for Bulletin 1-61.



LEFT: Sectional view shows disc packing with pressure plate and spring assembly.
RIGHT: Alternate molded packing installed.

Versatile DS Series Swivel Joint readily adapted to a wide range of services...

There is a Chiksan packing type and compound for handling nearly every chemical in commercial use, also steam and hot gas as well. Further, the DS Series Joint permits packing replacement without removal of ball bearings.

HANDLING PETROLEUM PRODUCTS?

For petroleum service, Chiksan offers you a complete line of spring balanced arms. Choose between the Folded Arm (shown above) or a Sliding Sleeve. Long Reach and Bottom Loader models too. Bulletin 1-61 contains full descriptions. Send for your copy now.

FOR COMPLETE INFORMATION MAIL COUPON TODAY

CHIKSAN COMPANY, 330 North Brea Blvd., Brea, California

Please send me copy of Bulletin No. 1-61.

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CHIKSAN

A SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

61-62

CHIKSAN COMPANY—General Offices: Brea, California • Well Equipment Mfg. Corp. Division (Weco Unions, Homer Valves) • Chiksan International • Chiksan of Canada Ltd. Offices and Representatives in Principal Cities of the World

Check 3341 opposite last page.

Profit sharing is another factor to be considered and is sometimes stipulated by law. In one instance, it is required that a Christmas bonus of one month's pay be provided.

Social security, old-age benefits, accident insurance, unemployment pay, children's allowance, death benefits and many family subsidies can contribute to increased costs in building and operating overseas.

More Employer Obligations

Social security insurance payments for the employer can in some cases be equal to 40-45% of the worker's pay. Another fringe benefit that is sometimes required according to law is transportation for employees from the neighboring village to the plant site. This may require purchase of a bus to provide this service. Housing, hospitals, recreation centers and many other extras are factors to be provided in many cases.

Generally the obligations of the employer are stronger and more deepseated than in the United States. In long periods of slow activity the employer, in many cases, is obligated to keep his employees on the payroll. And, labor regulations will sometimes specify that a worker may not be fired for incapability after ten-year employment.

How Big A Plant?

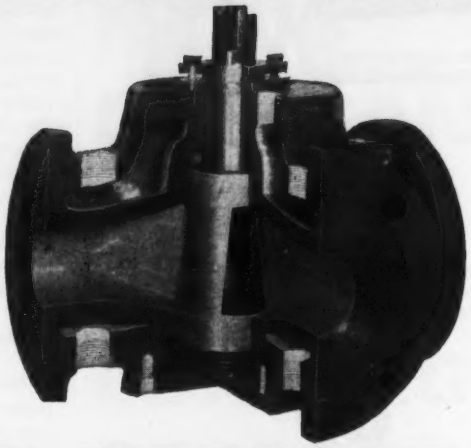
It is axiomatic that a thorough market research study be made before an overseas venture is undertaken. In pioneering any particular commodity in a certain country, it is always attractive to consider the advantages of being first in the market. However, it is important to determine what the plant capacity should be in order to satisfy that market.

In many instances, it will be found that this plant capacity will be considerably less than a plant in the United States producing the same commodity. The capacity required may be as low as one-

Jacketed Spring Loaded
PLUG VALVES

KEEP VISCOUS PRODUCTS FLOWING ECONOMICALLY

- WRENCH OR AIR CYLINDER OPERATED
- SPRING LOADED
- NON-LUBRICATED
- ALL SIZES
- ALL ALLOYS



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H & B's fully jacketed spring loaded plug valves feature an inverted tapered plug inserted and lapped into the housing from the bottom of the valve—then spring loaded. The spring wedges the plug to a perfectly tight seal, eliminating troublesome leaks. Easy to operate—no big handwheel . . . no freeze . . . no "breaking loose" necessary. Easy to clean. Made in straight, angle, or multi port design.

For complete jacketed systems, send for Bulletin J-57

HETHERINGTON & BERNER INC.

A Wholly Owned Subsidiary of American Hoist & Derrick Company

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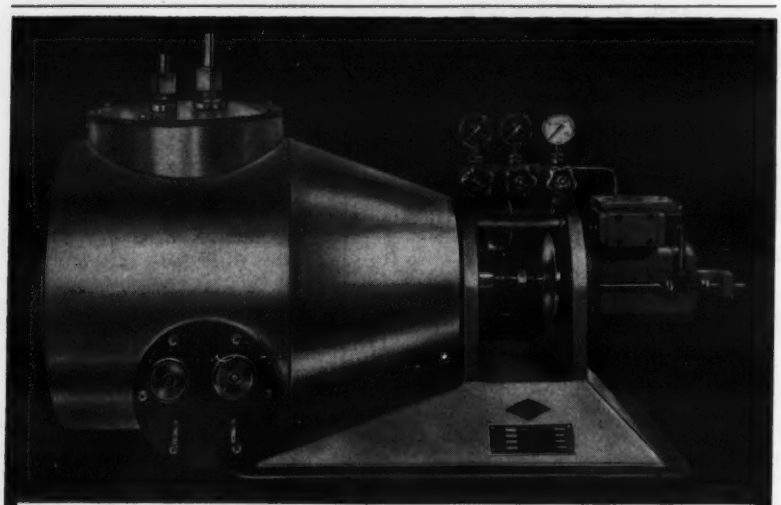

NEW CRYOGENIC PUMP!

For low-temperature pumping of OXYGEN, NITROGEN, ARGON, METHANE. Highly efficient. Stationary or truck mounted. WRITE FOR DETAILS.

AMERICAN MESSER CORPORATION

CHRYSLER BUILDING 405 LEXINGTON AVENUE NEW YORK, N.Y.

Check 3343 opposite last page.

Building Overseas

From preceding page

tenth to one-fifth of a comparable plant in the U.S.

Plant costs per unit of production will thus be much greater for the smaller plant overseas. For example, in chemical plants, where single rather than multiple unit installations are the rule, the 0.6 power relationship between cost and capacity generally prevails. As a consequence, the cost of a plant for one-tenth of the capacity will be one-fourth of the cost, and a plant for one-fifth capacity will be about 40% of the cost. In the one-tenth size plant then, plant cost per unit product will be 2½ times the large plant, and for the one-fifth size plant, it will be twice the large plant initial cost.

Land Costs

Realistic appraisals of land costs are important in selecting the plant site overseas. This can be a real eye-opener. It has been our experience that land costs overseas are consistently higher than in the U.S. Prices as high as $50,000 an acre for industrial land are sometimes experienced.

Climatic Conditions

Problems created by unusual weather conditions will have to be faced. High and low temperatures, unusual rainfall or snow conditions and high altitudes can contribute to slowdowns and more expensive equipment design. Thorough study of unusual conditions is a must.

Despite the fact that there can be much disillusionment, as indicated above, there are a number of areas overseas that offer opportunities for the production and marketing of many commodities.

A series of descriptive bulletins containing resumés of general conditions for those who wish to establish businesses in overseas countries are available from the U.S. Department of Commerce. In addition to a number of points covered herein, they include basic laws, business organization regulations affecting foreign firms, industrial property rights and taxation. ■

P.F.I.

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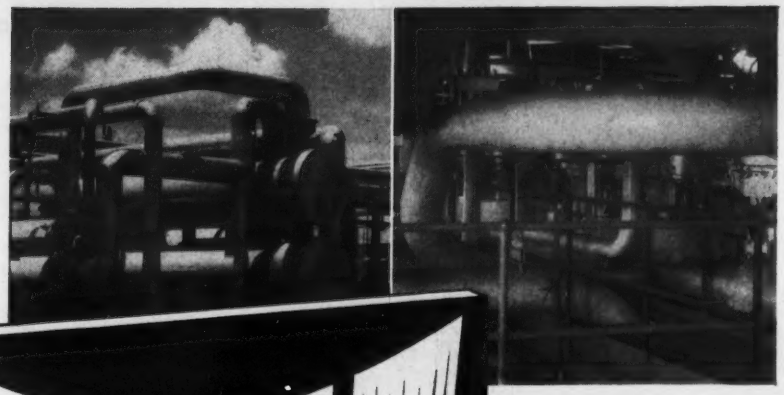

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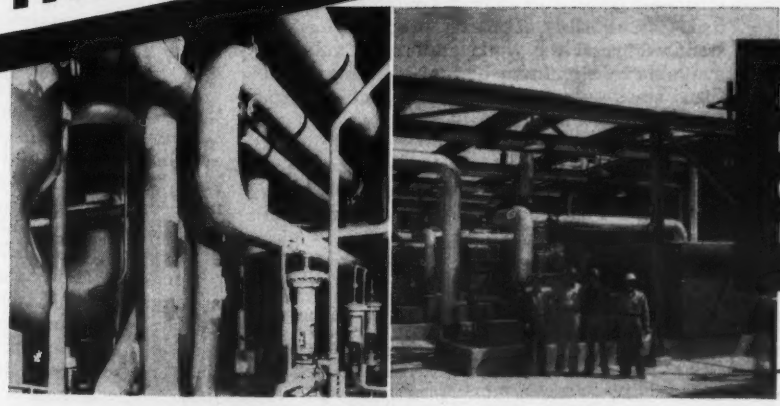
The technical and engineering committee groups of P.F.I., through their publications, have pioneered and established the highest standards for pipe especially in the area of high pressure and high temperature applications.

All reasons why . . . your piping needs are best served by members of P.F.I. A list of PFI Standards will be sent you on request so you can select the publication most useful for your needs.



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See Membership List on opposite page . . .

Check 3345 opposite last page.

Tech Men & Managers

From page 44

appraise their situation as technical men in industry. Good technical people have a considerable choice as to whether they want to work in private industry, private institutions, Government laboratories or academic institutions.

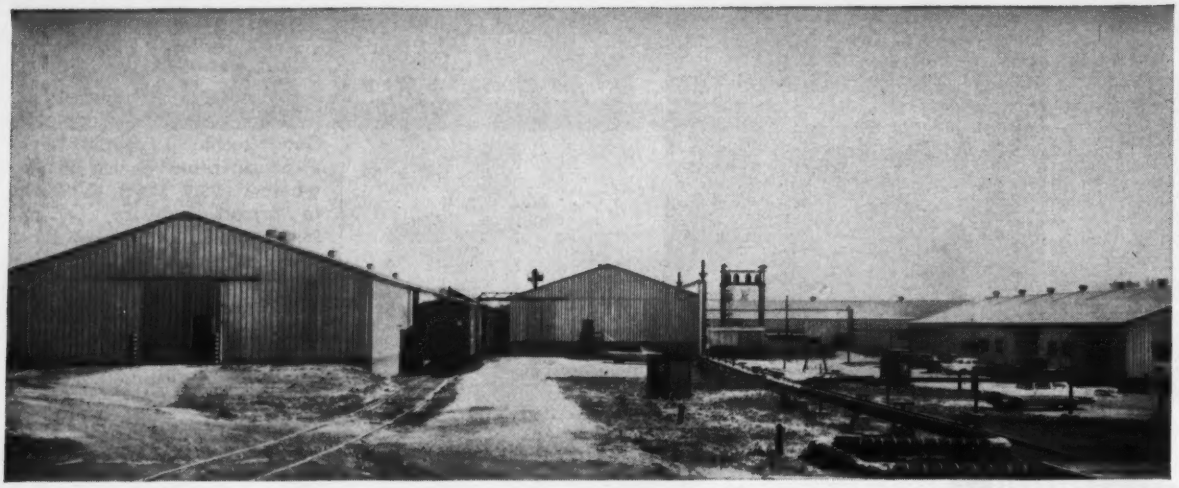
By making the choice to work in private industry, they should be prepared to give up the type of recognition associated with the other groups. After all, there are many positive compensations in industry. I believe that by seeing themselves objectively in an industrial setting, their conflict with management would largely disappear."

"Relatively few technical employees would respond to the university-type of atmosphere," according to R. D. Scott, vice president, manufacturing and development, B. F. Goodrich Chemical Company. He goes on to say:

"I do not feel that the average technical employee truly desires to be freer of pressure and commercial drive. He is frustrated by lack of good direction, lack of interest by others in his work, and by decisions unknown to him which affect his sphere of operation. Good intelligent reasons and lines of communication can combat these problems. Most of the responsibility for this gap in thinking rests on the managers' shoulders. It can and should be materially reduced."

The manager of engineering and construction of one of the major chemical companies questions the advisability of technical men becoming too concerned with management problems. He says, "Any time we tend to dilute their efforts in the technical field too much and get them too concerned with problems of management, we tend to get less results in the overall technical field. A half-and-half mixture of technical man and manager will produce mediocrity in both areas, and the profit picture of the company will suffer."

Many companies feel the problem can be overcome by giving greater recognition to scientists and engineers. Along



Four of the six Butler buildings used for the manufacture and storage of explosives at New Castle, Pa. by the Organic Chemicals Division of American Cyanamid Company.

IN STEP WITH A FAST-MOVING INDUSTRY

...buildings pre-engineered by Butler

New developments . . . new pilot plants . . . new production facilities . . . all part of the normal climate of America's fastest growing industry. What better way to move ahead in the chemical field than to *standardize* on performance-designed Butler pre-engineered buildings!

Here is all the strength and permanence of steel . . . in good-looking, completely functional buildings. Note the spacious, clear-span interior of this example: there are no posts or trusses to interfere with efficient materials handling; in a Butler building, you can use *all* the space you buy from wall to wall—from floor to ridge.

Yet, owners all over America find that such buildings can be erected at an eminently sensible cost . . . for plant expansion, pilot plant construction, erection of offices or warehouse facilities. Butler's precise, pre-engineered structurals and cover panels speed construction—cut maintenance costs to the bone.

And . . . only with Butler pre-engineered buildings do you get your choice of *two* superior wall panels: Monopanl®, Butler's exclusive, factory-insulated panel (actually a complete wall in itself); Butlerib™, Butler's precision-formed standard panel for walls and roof. Both are available in aluminum or long-wearing galvanized steel—plain, or in a variety of durable, factory-applied colors.

When you think in terms of building, think of Butler—the lowest-cost way to build well! For details, call your Butler Builder. He's listed in the Yellow Pages under "Buildings" or "Steel Buildings"... or, write direct.

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Check 3346 opposite last page.

Tech Men & Managers

From preceding page

this line, quite a few companies have developed programs which permit technical personnel to advance along parallel lines to management while continuing to follow technical pursuits and use their creative talents to maximum advantage.

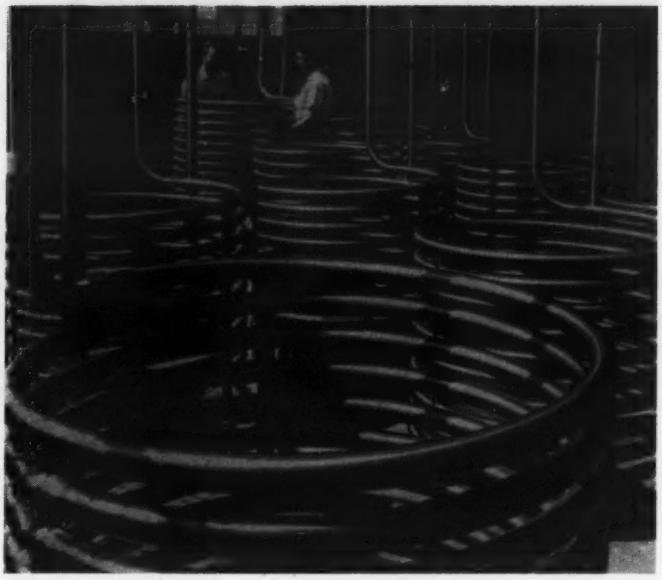
Phillips Petroleum has a forward-looking engineering employment program that strikes at major causes of dissatisfaction. Emphasis is given to professional recognition, elimination of non-technical work, promotion based on performance, and good working conditions. Telescoping of salaries receives special attention. As a result, Phillips has a high morale among technical personnel and a turnover of only 5.2% (see June 1960 CP, page 33).

While companies are taking steps to bridge the gulf between technical people and management, scientists and engineers must realize that they should modify their opinions to some extent. For example, it is not likely that a technical man can have complete freedom in a corporation since such an organization is based on teamwork. A company must make money to exist. Also, the engineer or scientist in a company does not take the risks that a medical doctor or lawyer does in a private business. Hence, it is difficult for him to have the same freedom as these other groups.

Technical people do not seem inclined to want to become unionized in order to gain their expectations. Out of the million technical professionals in industry, only about 50,000 belong to some type of professional union.

Hence, better communications and recognition of the contributions of each other are the best way to bridge the gulf between the technical man and the manager. More general recognition of it as a problem will also help.

Certainly, it is vital to the advancement of American industry that the conflict be resolved. A strong, productive team of scientists and engineers — with high morale — is vital to progress. ■



Each of the titanium units has 120 linear feet of 2"-diam tube, coiled into 10 convolutions

45 titanium heating coils to pay out in 1.3 years

Mass-produced units in two National Lead Company plants should result in annual savings of $50,000

Problem: Steam coils heating 25-30% H_2SO_4 solutions lasted only nine months at the Sayreville, New Jersey, and St. Louis, Missouri, pigment plants of National Lead Company. Although corrosion was partially to blame, major difficulty was excessive buildup of metallic sulfates on the coils.

A NEW SOLUTIONS FEATURE

The deposits accumulated rapidly and heat transfer rates nose-dived. Scraping, cleaning, chipping or brushing had little effect and were impractical. The best recourse was to progressively boost the steam pressure as the deposits increased. When maximum pressure (125 psi) could no longer adequately do the job, the heating coils were replaced.

Installed in production lines where the acid solutions are heated up to 217°F maximum, the two plants had a large number of such coils in operation. Each unit was made of 2" OD, heavy, malleable metal tube, weighed 1300 lb and cost approximately $1000.

Solution: Because of its immunity to corrosion and good heat transfer characteristics, titanium equipment was considered for the application. A prototype unit was fabricated and installed for test purposes in 1957. Produced from seamless titanium tube, the unit that was purchased cost $2290.

Results were excellent. Although sulfate buildups occurred, the titanium coil was found to have the characteristic of "shedding" the deposits during normal tank boil-outs, after the material built up to about 1/64" thick. No scraping or cleaning of any kind was required. Service life of coil was expected to be indefinite.

Another big advantage was the unit's light weight — only 74 lb versus 1300 for the conventional coils. This greatly simplified handling and cut installation costs.

Competitive Quotes

Based on the encouraging performance given by the test unit, six equipment sources were invited to submit quotes on fabricating five such titanium heating coils. Requirements called for 120 linear feet of 2"-diam tube, coiled into 10 convolutions, with legs, spacers and risers to be welded into position.

Unlike the prototype unit, which had seamless tubes, engineers recommended use of welded tube. (Tests had shown that the conditions encountered did not require the more expensive seamless product.) Since tube was shipped in lengths of 18 feet, seven joints were required per coil. Each bidder was asked to provide a sample of titanium weld.

Bids ranged widely — from $363 to $2000 per coil. After careful evaluation, fabricator that quoted $464 was selected. Metal costs were an additional $992 per unit. The same firm was then given an order for 40 more such titanium heating coils.

Data comparing the titanium units with those previously used are listed below.

	Ti	Previous Units
Tube size, in	2	2
Coil size, in	38x38½	31½x37
Area, sq ft	52	39
Weight, lb	74	1300
Total cost, $	1456	1000

About 65 manhours were required to manufacture each coil. Extreme care had to be taken to prevent the titanium

About 65 manhours were required to manufacture each coil. Cost per unit was $1456

from picking up oxygen or nitrogen during welding. Presence of these elements in quantities of as little as 0.5% can embrittle a titanium weld beyond point of usefulness.

Argon Blanket Used

The fabricator avoided this difficulty by use of an argon blanket. A standard Heliarc welding gun was modified to include a simple canister. Packed with copper turnings (shredded from a cooking utensil cleaning pad), the device is taped around the head of the welding gun. Argon gas, fed into the canister, is diffused by the copper turnings and blankets the weld zone.

Results: The titanium equipment is expected to result in annual operating savings of $50,000 — paying for itself in 1.3 years. As of this writing, 13 of the 45 coils have already been placed into service and are doing an excellent job. The additional 32 are scheduled for installation in the near future.

Because of their resistance to sulfate buildup, considerable savings are also being realized in steam consumption. Higher heat transfer rates are being achieved at much lower steam pressures. According to reports, 30-lb pressure can now essentially do the same heating job that 125-lb steam used to do.

(Titanium heating coils were fabricated by Saffran Engineering Company, St. Clair Shores, Michigan.)

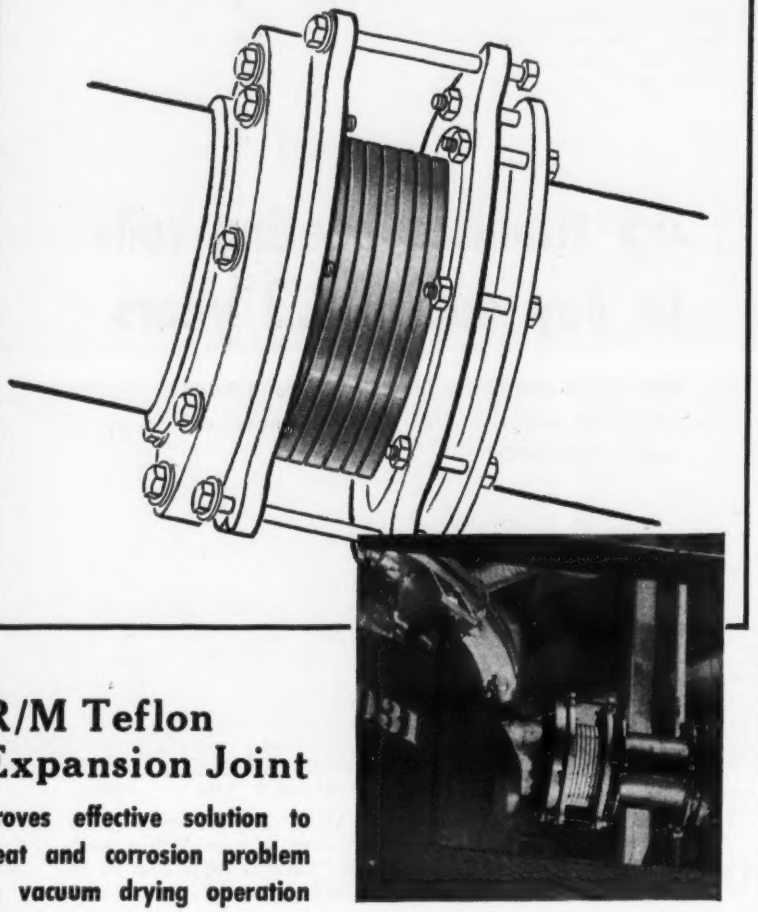
Check 3348 opposite last page.

(Further information about titanium may be obtained from Titanium Metals Corporation of America, 233 Broadway, New York 7, New York.)

Check 3349 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

R/M CAPABILITY DOES IT AGAIN!



R/M Teflon Expansion Joint

proves effective solution to heat and corrosion problem in vacuum drying operation

When an expansion joint was needed for high-temperature service on a vapor connection in a vacuum drying operation used in making dyes, the Toms River Chemical Corporation, of Toms River, N.J., turned to R/M. Result: An R/M machined Teflon* joint. Not only did the joint stand up to operating temperatures of 210-220°F, but it also resisted corrosion due to the various chlorides in the system.

R/M selected Teflon for the application for several important reasons. Teflon has excellent heat stability and is virtually impervious to attack from or reaction with all but a few known chemicals. Teflon has excellent nonadhesive properties.

Toms River Chemical Corporation realized other advantages, too. Machining to close tolerances with uniform wall thickness provides maximum resistance to fatigue and vibration. And an adjustable tie rod limit bolt arrangement prevents overexpansion of joints.

R/M, as a major producer of mechanical packings and gasket materials for industry, has the experience and capability to help solve your packing problem. Write for technical literature.

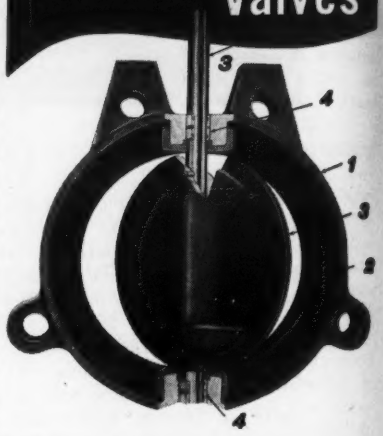
*Registered trademark for Du Pont fluorocarbon resins

RAYBESTOS-MANHATTAN, INC.
RM PACKINGS
PACKING DIVISION, PASSAIC, N.J.
MECHANICAL PACKINGS AND GASKET MATERIALS

Check 3347 opposite last page.

PACKED with COMPETITIVE ADVANTAGES

ROCKWELL Resilient-Seated Butterfly Valves



1 Less weight, space and cost: Valve face-to-face, overall height and weight are one-fourth to one-eighth those of gate valves. Cost less initially and are easier to install.

2 Drop-tight, leakproof closure. Resilient elastomer liner forms positive seal with disc. Liner removable on the job.

3 Disc and shaft assembly designed for highest rated pressure under most severe operating conditions; always operable manually or automatically.

4 True close bearing fit for shaft; non-leaking, non-galling, corrosion-resistant.

5 And what is quite obvious: the streamlined, self-cleaning design that eliminates cavities and voids in body; low pressure drop; no fouling. Valve can be installed in any position.

Bulletin 590X gives all the powerful facts. Write for a copy.

W. S. ROCKWELL COMPANY
2200 Eliot St. • Fairfield, Conn.
Made and sold in Europe by COCKBURNS, Ltd., Glasgow S.W.2, Scotland

Check 3350 opposite last page.

▸ A NEW SOLUTIONS ARTICLE

Inconel heat exchanger handles 300°F HF 'round the clock

Unit is installed in AEC uranium plant

Anybody who has worked with it will agree . . . 300°F hydrofluoric acid can be tough to handle. The highly corrosive

Frequent inspections by plant engineers have failed to reveal any signs of deterioration in heat exchanger handling 300°F HF

fluid will devour equipment in a hurry, if the wrong material of construction is used.

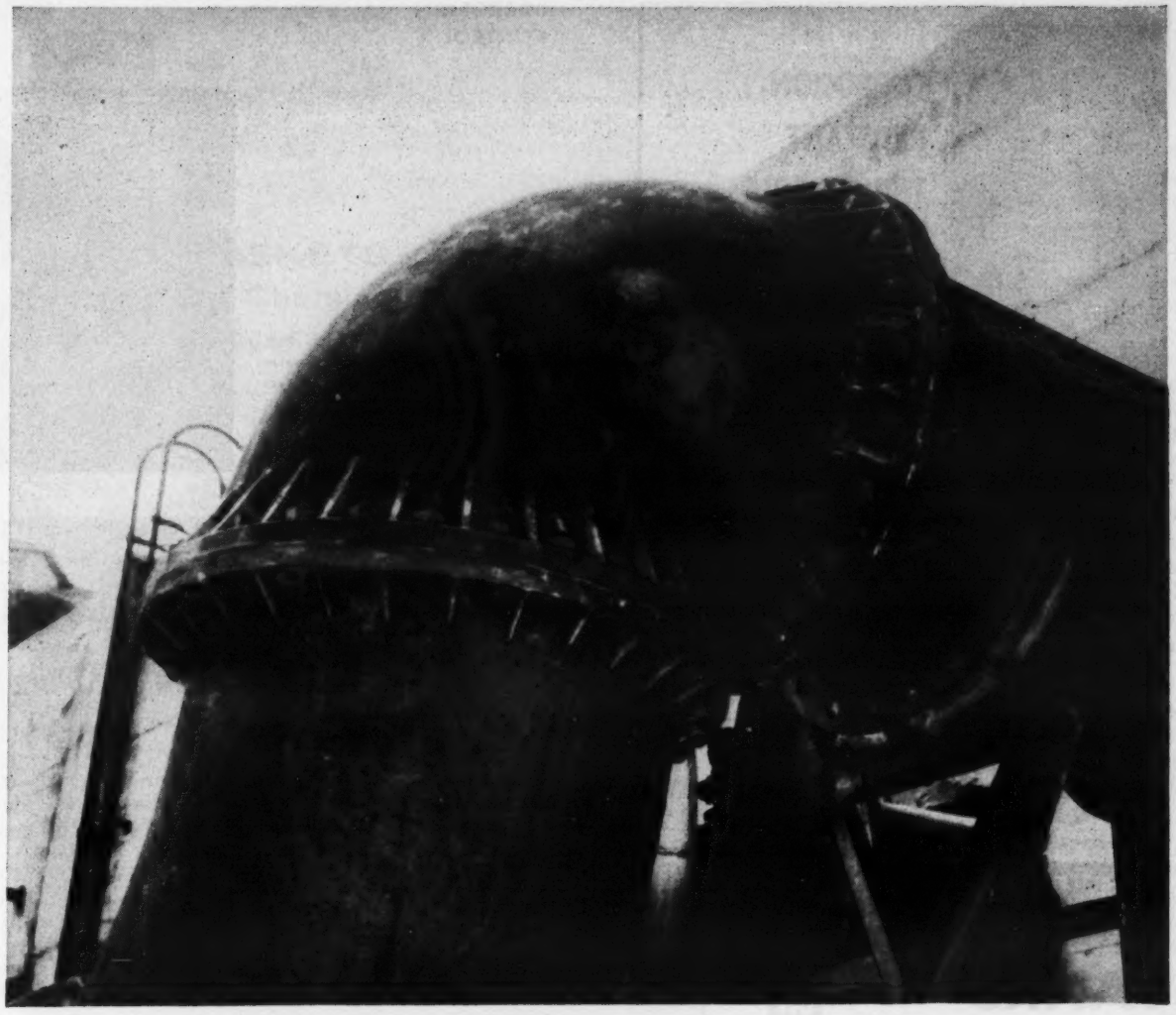
However, the acid presents no problem at the Weldon Spring, Missouri, uranium processing plant operated for the AEC by Mallinckrodt. A double-pass, shell-and-tube heat exchanger having Inconel alloy tubes has been handling anhydrous HF at above 300°F since April, 1958 — running continuously 24 hours a day, five to seven days a week. Frequent inspections have revealed no signs of failure and the unit has been operating maintenance-free.

The heat exchanger processes hydrofluoric acid that has been vaporized with low-pressure steam to about 150°F.

Passage through the tubes superheats the vapor to above 300°F, readying it for reaction with uranium dioxide to form "green salt" (uranium tetrafluoride).

(Heat exchanger was manufactured by Patterson-Kelley Company Incorporated, East Stroudsburg, Pennsylvania.)

Check 3351 opposite last page.



Cast Nickel Stainless header elbow handles hot SO_2 gas for 15 years

Type HH alloy casting delivers seven times the service of previous castings at 1800° F.

Hot, corrosive SO_2 gas was eating header sections out of sulfur burners every 2 to 2½ years at a sulfite plant run by one large paper-making company.

Then engineers ordered an elbow section cast of type HH* alloy, containing 11 to 14% nickel and 24 to 28% chromium. That was 15 years ago, and the elbow—still in service today—has delivered more than *seven times* the service of previous castings. As a result, engineers at this company have been replacing headers, section by section, with type HH alloy castings ever since.

Special advantages to chemical industries. Type HH alloy is only one of a family of nickel-containing casting alloys offering specific combinations of useful engineering properties. Among these are superior strength and ductility at temperatures from 1200° to 2100°F...superior resistance to acid and caustic corrosion and erosion. Easily castable and available from nearby foundries, nickel-alloyed castings are an ideal choice when you want to protect product purity, prolong the life of your equipment and cut downtime and replacement costs.

Get helpful information on the nickel-containing alloy best-suited for your plant. Drop a note to Inco for your free copy of the 72-page, comprehensive booklet, "Heat Resistant Castings, Corrosion Resistant Castings... Their Engineering Properties and Applications." There's a good chance that it will suggest ways that you can cut costs in corrosive and high-temperature environments. Just ask for booklet A-266. *Alloy Casting Institute designation

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

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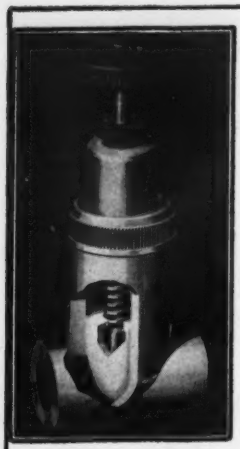
NICKEL MAKES ALLOYS PERFORM BETTER LONGER

Check 3352 opposite last page.



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- Full flow and no pressure drop—like a gate valve
- Throttling control—like a globe valve
- Socket-weld—screwed and flanged ends—½" to 2" sizes—rated for 150 lbs.

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Vanton PUMP & EQUIPMENT CORP.

DIVISION OF COOPER ALLOY CORP., HILLSIDE, N. J.

Check 3353 opposite last page.

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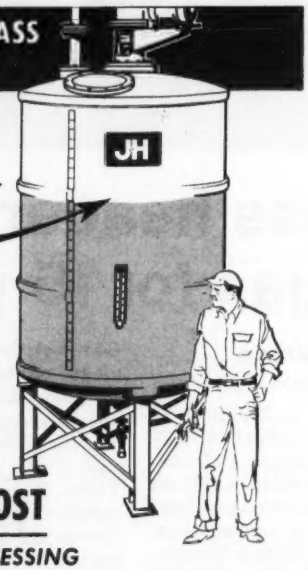

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***LESS-* than HALF the COST**

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JONES & HUNT INC. 102 Emerson Ave., Gloucester, Mass.

Check 3354 opposite last page.

Stainless alloy sections that make up this 30" diameter header are expected to last over 15 years

Expected to have a service life of well over 15 years, big stainless-alloy castings at sulfite pulping plant . . .

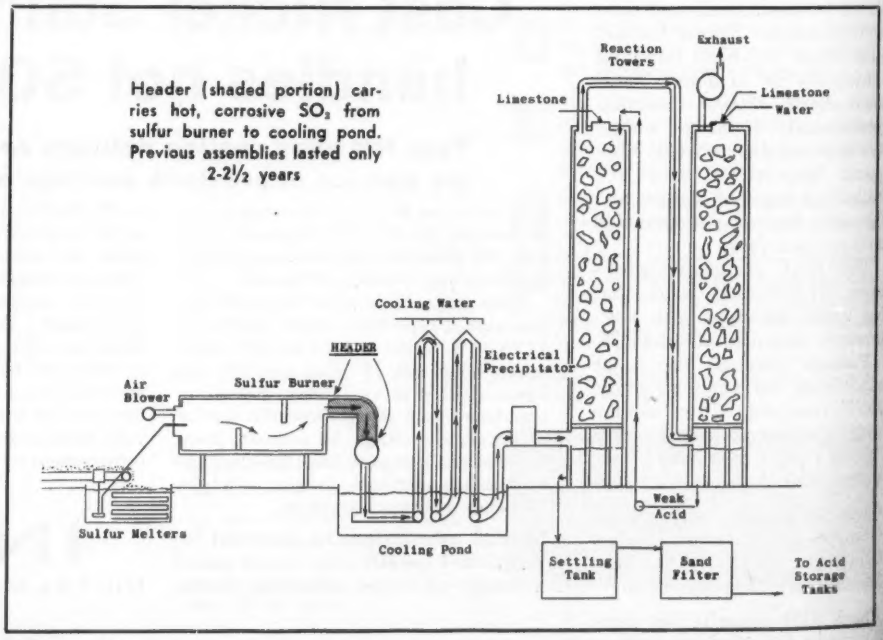
Battle corrosive SO_2 at 2280°F

A NEW SOLUTIONS FEATURE

Problem: Twin 30"-diameter headers carrying hot, corrosive SO_2 gas had to be replaced every 2-2½ years at Weyerhaeuser Company's sulfite pulping plant in Everett, Washington. Located outdoors between the sulfur burner building and a cooling pond, each of the big lines was made up of high-chromium, cast-iron components, including elbows, a "T" manifold, and numerous straight and reducing sections.

Atmosphere in the headers is 17% SO_2 — over 11,000 grains of sulfur per 100 cu ft — at a mean (take that either way!) temperature of 2280°F. Depending on location in the line, temperature of metal averages 1800 to 2000°F.

The headers play an important role in the production of calcium bisulfite used in the plant's pulping operations. Its



manufacture starts with the igniting of molten sulfur in spray-type sulfur burners to form SO_2. The 30″ headers carry the gas to pipes in the pond where the SO_2 is cooled to 68°F before being passed through limestone towers for conversions to calcium bisulfite.

Solution: As the need arose, engineers started replacing header components with special stainless alloy castings. Selection was based on previous experience with the metal, which contains 25% chromium and 12% nickel. In addition to excellent high-temperature strength, the alloy has good resistance to sulfur-bearing gases under oxidizing conditions.

The wholly-austenitic-grade stainless also provides high creep strength where load and temperature conditions are comparatively constant.

Specific properties of the metal (designated as ACI HH alloy, type II) at 1800°F are listed below.

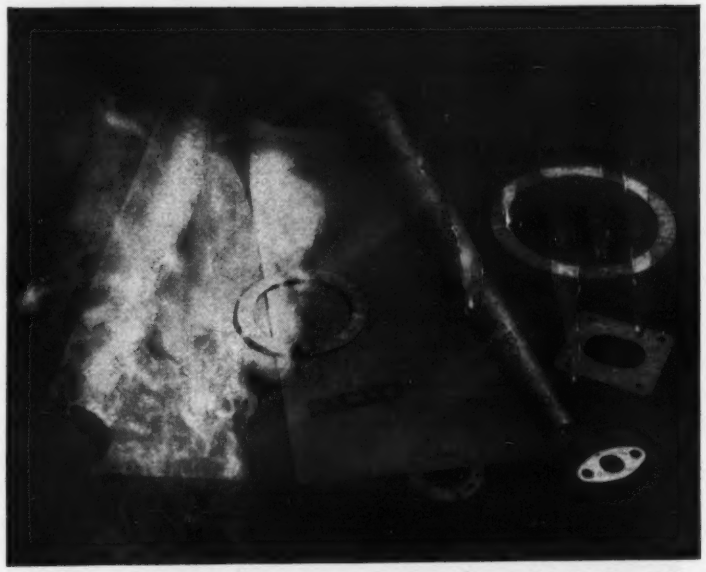
Short Time	
Tensile, psi	11,000
Yield strength, 0.2% offset, psi	7000
Elongation in 2", %	30
Long Time	
Limiting creep stress (rate, 0.0001%/hr), psi	2100
Stress to rupture, 10 hr, psi	6000
100 hr, psi	4000
1000 hr, psi	2500

Probably the most critical portion of the line that was replaced was a "T" manifold. This component serves both headers and receives full service regardless of which of the plant's two sulfur burners are in operation. The "T" casting is 58″ high and weighs approximately 2700 lb.

Results: More than two-thirds of the header assembly sections have now been supplanted by stainless alloy castings. Frequent inspections have revealed no signs of wear.

As yet, there is no final quantitative answer to service life. However, based on previous experience with the alloy,

GASKETS
for Chemical
Processing



For tight sealing against high temperature steam and corrosive liquids, specify Garlock gasketing . . . available in either sheet or cut form or special construction.

For all your gasketing needs, choose from a complete line of Garlock materials. Regardless of service conditions, there is a specific Garlock style for the job.

In either sheet form or cut to your specifications, Garlock offers Style 7021 synthetic binder and long fibre asbestos, superior for hot oil service at 700°F; Style 7228 high quality neoprene binder and long fibre asbestos, for gasoline, naphtha, benzine and other hazardous liquids and solvents, temperature to 300°F; Style 7705 synthetic binder with blue African asbestos fibre, excellent against hot and cold mineral acid; Style 900 long fibre asbestos with synthetic binder, for service against steam, gas, air, temperatures to 700°F; Style 7772, long fibre asbestos with synthetic binder, white in color, for service in chemical and petrochemical process equipment where leeching is a problem, temperatures to 700°F. Other gasketing materials available to meet your specific requirements.

In rubber sheet form, Garlock offers Style 7986 Neoprene sheet for flanged joints where oil resistant qualities of neoprene are required; Style 8495 Buna-N sheet for gasketing against oils and solvents at temperatures up to 300°F; Style 7992 Neoprene rubber diaphragm sheet for wet natural gas, gasoline, oils at medium or high pressures; Style 9296 Silicone-Dacron diaphragm sheet for hot or cold air, high aniline point oils and many fire resistant fluids such as cellulube at temperatures to 300°F.

For prompt delivery, complete gasket cutting facilities are available in Palmyra, N. Y., Philadelphia, Pa., Houston, Tex., San Francisco, Calif., and Hamilton, Ontario, Canada. Get details by contacting the nearest of the 26 Garlock sales offices and warehouses throughout the U. S. and Canada. Or, write Garlock Inc., Palmyra, N. Y.

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Canadian Div.: Garlock of Canada Ltd.
Plastics Div.: United States Gasket Co.

Order from the Garlock 2,000 . . . . two thousand different styles of Packings, Gaskets, Seals, Molded and Extruded Rubber, Plastic Products.

Check 3355 opposite last page.

expectations are that headers will last over 15 years. Savings realized in replacement and maintenance costs easily justify the alloy's higher initial price.

Although cast stainless steel has been used in many critical stages of sulfite pulping, Weyerhaeuser engineers believe this was the first time it has been used in header assemblies.

(Additional information about ACI type HH alloy may be obtained from Alloy Casting Institute, 1001 Franklin, Garden City, New York.)

Check 3356 opposite last page.

Manufacturing rights for Ti-Pd alloy OK'd by Carbide

TMCA will alloy ti with 0.15% Pd

Titanium-palladium — the alloy with excellent corrosion resistance — has gone into commercial production. License to manufacture the material has been granted by Union Carbide Metals Company, Division of Union Carbide Corporation, to Titanium Metals Corporation of America. Latter will alloy titanium with 0.15% palladium.

The alloy was discovered by Union Carbide in 1959 (see CHEMICAL PROCESSING, May 1959, page 158). Tests have shown that addition of as little as 0.1% palladium greatly improves the corrosion resistance of titanium.

In reducing environments, such as HCl and H_2SO_4, titanium has been previously under a handicap. For example, in boiling 5% solution of HCl, titanium dissolves at a rate of more than 1" per year. However, addition of 0.1% palladium cuts this to less than 0.01" per year.

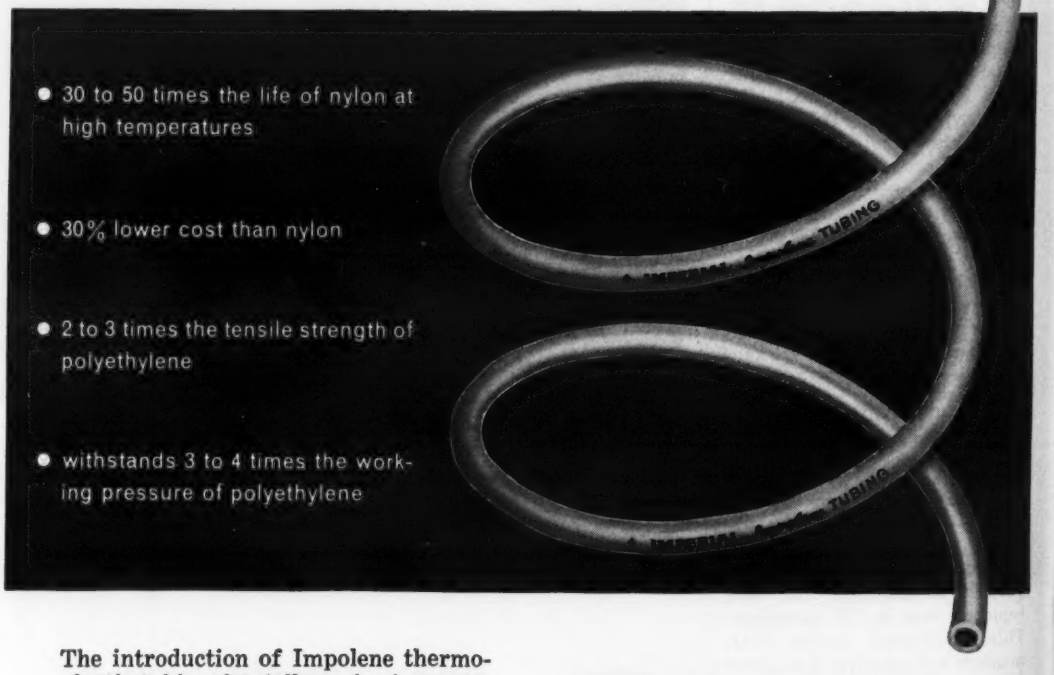
Mechanical properties of the alloy are the same as those of unalloyed titanium. Adding as much as 0.2% palladium has no affect. Likewise, palladium has no influence on the tensile properties (strength or ductility) of titanium. The palladium-bearing titanium can

new

Impolene

stabilized polypropylene

tubing


• 30 to 50 times the life of nylon at high temperatures
• 30% lower cost than nylon
• 2 to 3 times the tensile strength of polyethylene
• withstands 3 to 4 times the working pressure of polyethylene
TUBING
TUBING

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High tensile strength. Highest strength-to-weight ratio of all thermoplastic tubing. Working pressures compare favorably with nylon—are 3 to 4 times greater than polyethylene.

Excellent corrosion-resistance. Resists concentrated hydrochloric acid up to the boiling point. Withstands saline solutions at temperatures over 212° F. Shows no detrimental effects in boiling sulfuric acid.

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Odorless . . . tasteless . . . resists sunlight. Approved by the FDA and NSF for food and drinking water applications.

Use Impolene tubing for air lines, control panels, instrumentation and lubrication systems, processing and construction machinery—many other uses.

Available in 500′ to 1000′ spools in O.D. from ⅛″ to ⅜″. Other sizes available on special order.

Poly-Flo Fittings—designed for use with all plastic tubing, yet usable with soft metal tubing. Withstand pressures beyond burst strength of tubing. Available in a complete range of sizes and styles.

Now Imperial-Eastman meets all your requirements for hydraulic-pneumatic-flow system components: tube fittings, valves, couplings, flexible and rigid hydraulic and pneumatic lines, thermoplastic tubing, tubing tools.

TUBING

IMPERIAL — EASTMAN

Check 3357 opposite last page.

be cold- and hot-worked without difficulty.

(Further information about titanium-palladium alloy may be obtained from Titanium Metals Corporation of America, 233 Broadway, New York 7, New York.)

Check 3358 opposite last page.

Neoprene-base coating resists moisture, cold; is easy to apply

Needs no primer, has low initial cost

Uses: Protecting tanks, pipe and other equipment from corrosion.

Features: Coating performs effectively on exposed metal, concrete, wood and substrates.

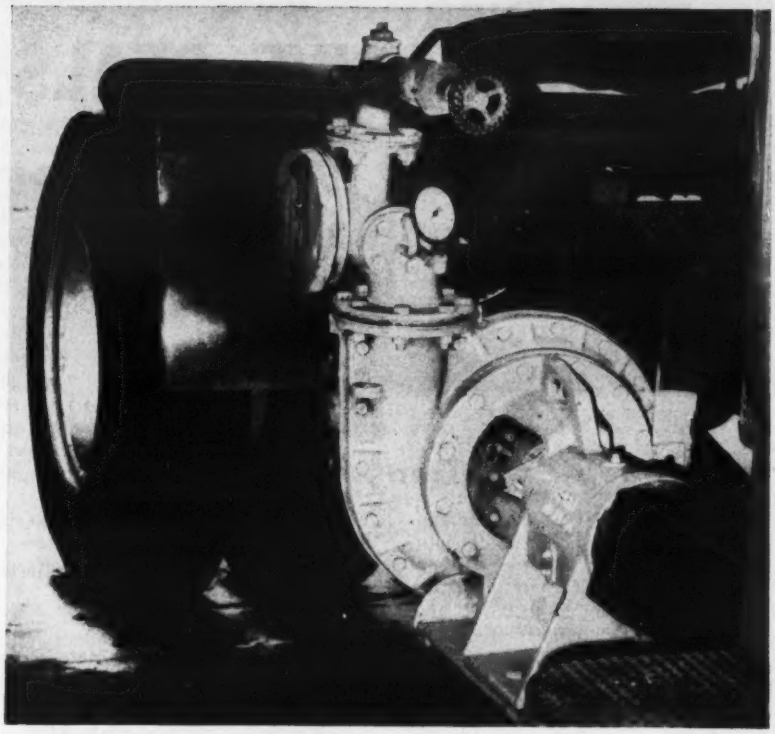
Description: Neoprene-base material combines advantages of neoprene and asphalt coatings. Product is easily applied by either spray, brush or roller coat.

No primer is needed. Coating will readily adhere to damp surfaces. Product has low initial cost and good resistance to moisture and weathering. Manufacturer states that it does not crack in cold temperatures.

(Perfecote formula 701 is product of Chemical Specialties Division of The Esbec Corporation, PO Box 929, Stamford, Conn.)

Check 3359 opposite last page.

"It keeps you going alright!"



Truck-mounted Dorr-Oliver® Pumps

selected for chemical cleaning service

A specialized service involving the removal of scale deposits from boilers, heat exchangers and process equipment in the utility, chemical, petroleum and other industrial plants is offered by Sumco Engineering, Inc., Passaic Avenue, Caldwell Township, New Jersey.

Under close supervision of service engineer, truck-mounted tanks and pumps are used to circulate chemical solutions through the equipment being cleaned. Service is often tough on the pumps, since corrosive chemicals and frequent accumulations of abrasive scale are handled.

To meet the varied demands of this service, the trucks are equipped with Dorr-Oliver Hypalon-lined acid-handling pumps, long recognized by the chemical industry for their freedom from leakage and their ability to stand up under corrosive and abrasive conditions.

Dorr-Oliver offers a range of pumps specifically designed for chemical applications. For information on types for your particular service, write to Dorr-Oliver Incorporated, Stamford, Connecticut.

Hypalon—Reg. T.M. E. I. duPont de Nemours & Co.

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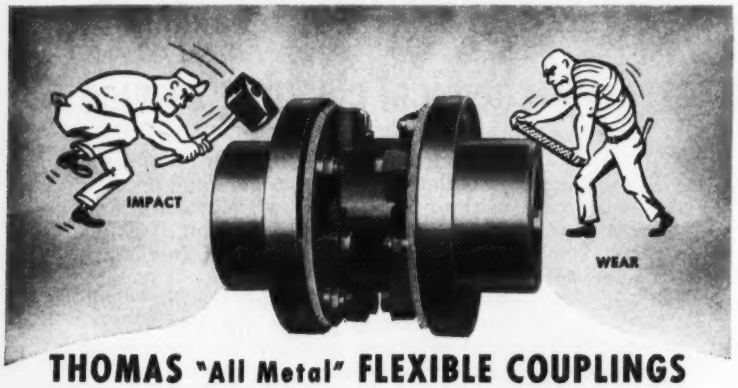
United Self-Energized Metallic O-Rings . . .*

provide positive static seals, in metal-to-metal applications, capable of withstanding temperature extremes from −452° to 3000° F. and pressures from 10^{-6} mm Hg to 100,000 psi. Manufactured in stainless steel, aluminum, copper, inconel and inconel X, United O-rings are unaffected by severely corrosive chemicals, acids and gases. Available with various coatings (including Teflon** and silver) ¼" O.D. to any size and configuration. United also makes non-vented and pressure-filled O-rings. **United Metallic "O" Rings, manufactured by United Aircraft Products, Inc., Box 1035, Dayton, Ohio.**

See United Metallic O-Ring Catalog in Sweet's Product Design File or write for Free Handbook

*Patents 2,809,269; 2,837,360
**DuPont registered trademark

Check 3361 opposite last page.



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Check 3362 opposite last page.

'Triple-threat' protection for cooling-water systems

Single application of pretreatment chemical achieves the following:

- **Removes interfering deposits**
- **Prepares metal surfaces**
- **Establishes tough, protective film**

IF YOU want to stave off corrosion in your new recirculating cooling water system, you had better do more than just flush it out before adding a conventional corrosion inhibitor. The explanation is simple: Inhibitors are designed to form and maintain protective films — they are *not* intended to prepare the metal surfaces to accept these films. To do a good job, a preparatory step, similar to rust removal and sand-blasting when painting or galvanizing surfaces, is required.

Too often, common practice is to simply acid-clean or water-flush the equipment. Following this, very little is done to protect the metal surfaces until the system is put into regular operation. Since no corrosion protection is available during this interim period, considerable damage can occur.

Corrosion may be started by residual acid or by wet stagnant conditions carried over from the cleaning steps. The condition may exist for weeks before the system is finally put into use and conventional inhibitor is added. The previously formed corrosion products make it impossible for an effective protective film to become established on the metal surfaces.

Now: A One-shot Treatment

Recognizing the need for a corrosion-retarding preparatory step for metal surfaces, a leading manufacturer of water-treatment chemicals diligently went to work and developed a pretreatment chemical that combines all of the necessary corrosion protection measures into one package. Truly a one-shot treatment, the product is capable of doing three jobs at the same time. Here's what it accomplishes:

First, it removes organic and inorganic materials and deposits. Next, it prevents the clean, activated metal from reacting with anything but the filming inhibitor present in the product, and finally — at the same time — it provides the initial protective film of corrosion inhibitor over the entire metal surface.

The equipment is then said to be protected. It can continue to be maintained in this state by the use of conventional corrosion inhibitors during normal operation.

Exact formula of the "triple-threat" chemical is shrouded in a cloak of secrecy. However, it is known to consist of a mixture of inorganic and long-chain organic compounds. No special handling precautions are required and product does not deteriorate with age.

Choice of Two

Actually, there are two compounds available. Each is said to form a tight protective film on all metal surfaces. Selection between them is determined by the specific application at hand.

For pretreating an entirely new cooling-water system, recommended dosage rates

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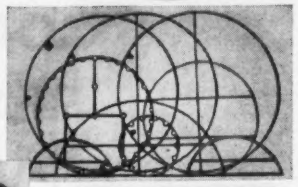

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CORRUGATED METAL GASKETS Plain or jacketed type. Made of ingot iron, aluminum, stainless steel, copper, brass, nickel and monel in all sizes and shapes. Ask for Bulletin 565.

Write for literature and discounts.

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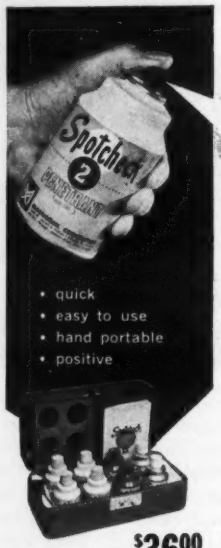

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Check 3364 opposite last page.

range from 600 to 1000 ppm. Exact amount is dependent upon temperature and cooling water characteristics.

The pretreatment chemical can also be applied to individual replacement heat exchangers and components. This can be done without affecting the protective film in the overall system. With the new units, a "soak" procedure is used. The pretreatment solution is prepared, and the tube bundle or other component from the replacement unit is immersed and removed, ready for immediate installation.

Old Units, Too

Benefits can also be obtained when the material is used on old equipment. Typical example involves an ammonia condenser in a large chemical plant. Although the unit had recently been acid-cleaned, after only a few weeks of use it showed a marked and steady decrease in heat-transfer rates.

The condenser was removed and examined. Corrosion and fouling were evident, again making acid-cleaning necessary. After acidizing, the unit was subjected to the one-shot treatment and returned to service. Continuous operation over an extended period of time has failed to affect heat transfer, which continues to be excellent.

(Based on technical paper presented at 21st Annual Water Conference of the Engineers Society of Western Pennsylvania by P. R. Puckorius, Nalco Chemical Company.)

(Further information about Nalprep 330 and 331* pretreatment chemicals may be obtained from Nalco Chemical Company, 6216 West 66th Place, Chicago 38, Illinois.)

*A Nalco Chemical Company trademark

Check 3365 opposite last page.

Corrosion in condensate lines of boiler systems is discussed in two-page data sheet. How the situation can be identified and corrected is told. Data Sheet "Return Line Corrosion" — Betz Laboratories, Inc.

Check 3366 opposite last page.

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ALL TYPES OF PIPE: plastic, aluminum, stainless steel, ceramic, synthetic rubber, carbon.

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Hold a "Chemfluor" Sheet in front of a light source. Note the uniform translucency and the complete absence of cloudiness and discoloration. These visual effects signify:

• UNIFORMLY HIGH DENSITY
• ABSOLUTE FREEDOM FROM CONTAMINATION

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*DuPont's TFE Fluorocarbon Resin.

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Tower Packings
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Always Specify KNOX Tower Packings
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for washing, cooling, processing, humidifying, dehydrating, and hundreds of other applications.
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CORROSION CONTROL

Hot, corrosive fluids measured accurately by device

Uses flowcell that has no moving parts

Uses: Measuring flow of corrosive or radioactive fluids. Liquids under high pressure or temperatures, or those requiring sanitary handling can also be conveniently handled.

Features: Device has accuracy up to ±1%, depending upon application. Stainless steel flowcell is obstructionless and without moving parts.

Description: Thermal flowmeter consists of two units; the flowcell and a completely transistorized electronic indicator mounted on an 8¾" relay rack panel. Flow is indicated on 4½" mirror-scale panel meter.

All sensing elements in flowcell are external to the flow stream and are isolated from it by welded seams. Smooth-bore construction assures negligible pressure drop, trouble-free operation, easy maintenance and cleaning.

The flowmeter is well suited to the measurements of flow rates in the laminar range, usually including Reynold's numbers up to 3000 or 4000. A single unit can cover wide range of flow — 1000:1 or more for viscous liquids.

(Further information about Model FMP-1 Thermol Flowmeter may be obtained from Flow Measurements Corp., 10506 Wheatley Street, Kensington, Md.)

Check 3370 opposite last page.

Polypropylene fittings available in 2-4" pipe sizes

Uses: Transferring various liquids and gases up to 150°F.

Features: Polypropylene pipe fittings can be installed quickly and easily by heat-sealing technique. Bond is stronger than unit itself and may be pressurized almost immediately after joining.

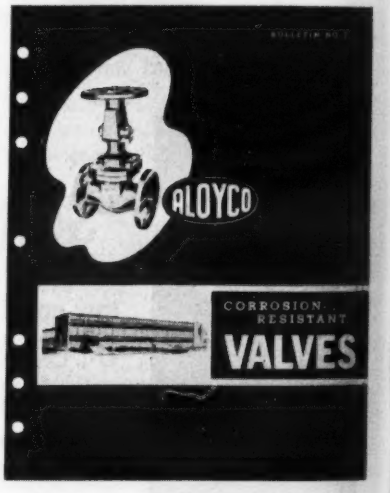
Description: Fittings are being stocked initially in two- and four-inch pipe sizes and

Write for this

COMPLETE GUIDE TO ALOYCO CORROSION RESISTANT VALVES

It quickly tells you what's available in Aloyco's line of stainless steel and high nickel alloy valves. Cross section illustrations cover 48 basic designs in pressure classes from 150# through 1500# services.

Included is a tabulation of alloy availability by design, and the complete analysis for each material offered. Also



outlined are engineering standards and adaptable features for standard valves.

This brochure summarizes Aloyco's 30 years of specialized experience in the design, development and manufacture of stainless steel valves. Write: Alloy Steel Products Company, 1302 West Elizabeth Ave., Linden, New Jersey.

1.3

Longer Lasting ALOYCO VALVES
SET IN CORROSIVE SERVICE

ALLOY STEEL PRODUCTS COMPANY

Check 3369 opposite last page.

schedule 40 and 80 wall thickness. Polypropylene has excellent corrosion-resistant properties.

(Further information about polypropylene fittings may be obtained from Tube Turns Plastics, Inc., 2929 Magazine St., Louisville 11, Ky.)

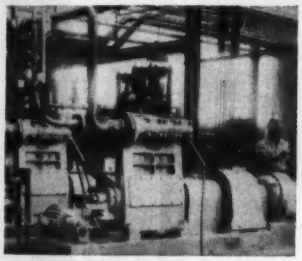
Check 3373 opposite last page.

▸ A NEW SOLUTIONS ARTICLE

Fifty percent caustic is 'duck soup' for pumps

Highly corrosive caustic soda, in the form of a 50% solution, has been handled continuously for over 18 months without difficulty by two reciprocating pumps at the Louisiana Division of Dow Chemical Company in Plaquemine, La. Units transfer the material at 400 psi from storage tanks to purification point in the production process.

Nickel alloy parts installed in the pumps account for the units' good behavior. Pump plungers and valve plates are



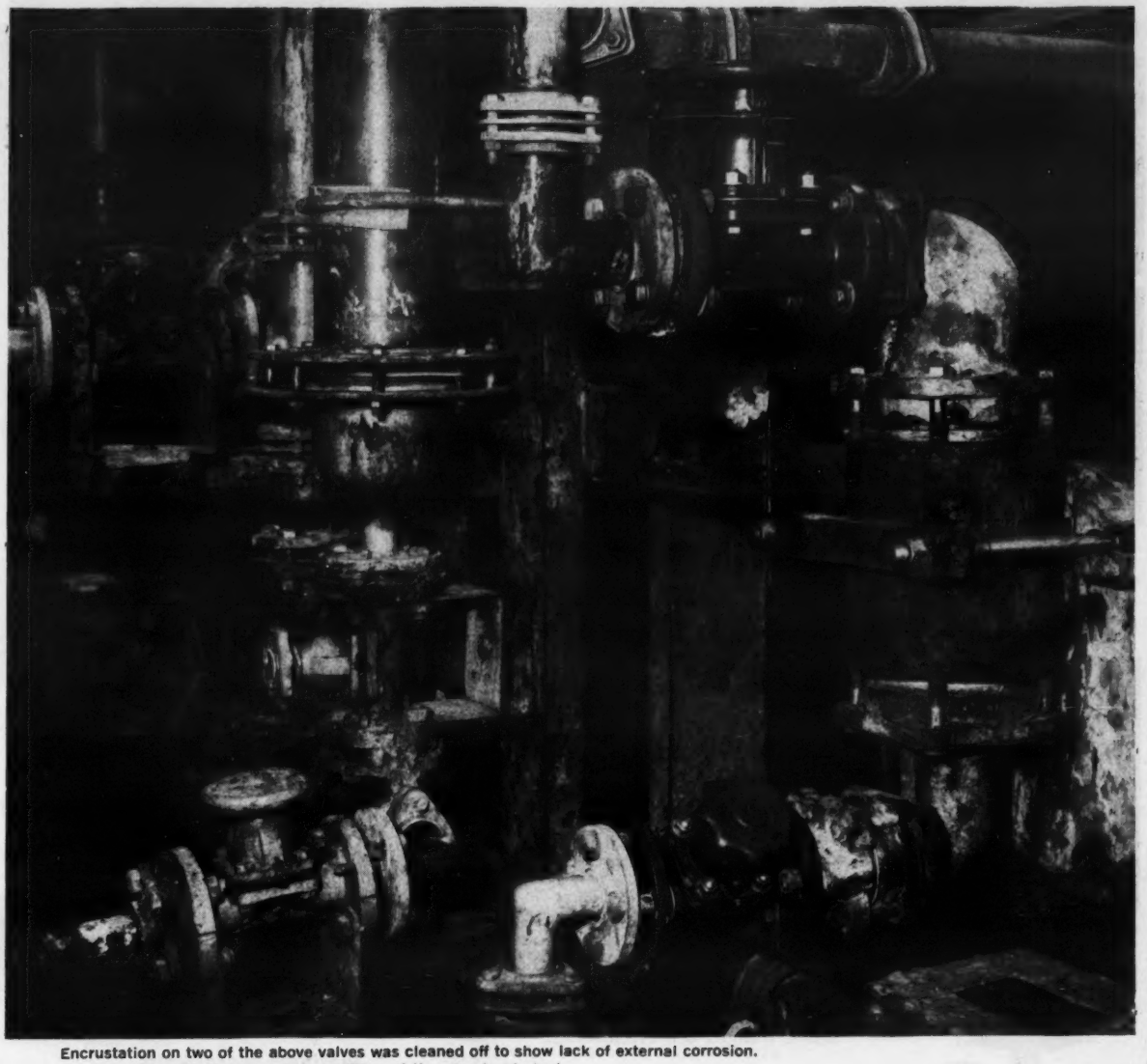
Two 3¼x5" triplex pumps handle 50% caustic solution without trouble. Units have been operating for nearly two years

made of "K" Monel. Valve seats are of "S" Monel and fluid ends contain 3½% nickel steel.

The pumps are 3¼ x 5" triplex direct-flow, reciprocating units. According to Dow engineers, operation to date has been completely trouble-free. Only routine maintenance has been needed.

(Reciprocating pumps with nickel alloy components are manufactured by Aldrich Pump Co., Allentown, Pa.)

Check 3374 opposite last page.



Encrustation on two of the above valves was cleaned off to show lack of external corrosion. Compare this with the corroded condition of the structural steel.

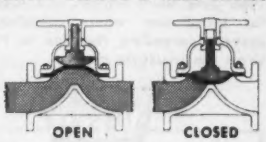
Grinnell-Saunders Diaphragm Valves resist attack by hot corrosives at Carborundum Metals Company

During the past few years, Carborundum Metals Company, a Division of the Carborundum Company, has installed over 200 Grinnell-Saunders Diaphragm Valves at their Parkersburg plant in West Virginia. These valves were coated internally and externally with Penton * —and were equipped with fluorinated plastic diaphragms, backed with elastomer cushions. Their job: to handle highly corrosive caustic soda and sodium hypochlorite–at 212°F, and methyl isobutyl ketone, hydrochloric acid, sulphuric acid at 130°F–all used in processing zirconium ore for zirconium and its co-product, Hafnium.

Today, this manufacturer reports that after being in operation an average of two years, the rugged Grinnell-Saunders Diaphragm Valves are still giving good service. What's more, they've never had to replace parts in these Grinnell Valves!

In Grinnell-Saunders Valves, the diaphragm lifts high for streamline flow – seals *tight* for positive closure. Working mechanism is completely isolated from material in the line to prevent corrosion and contamination. There's a wide choice of body, lining and diaphragm materials, too. See how Grinnell-Saunders Diaphragm Valves can help *your* installation.

Write Grinnell Company, Providence 1, Rhode Island.



** Reg. T.M., Hercules Powder Co.*

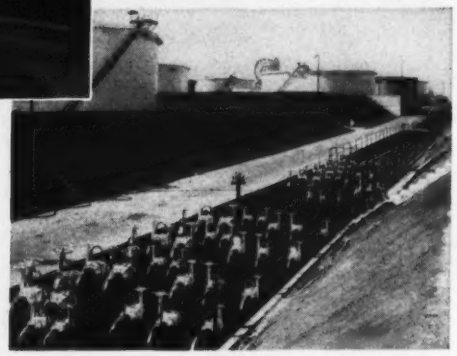
GRINNELL

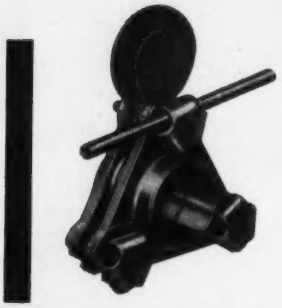
GRINNELL COMPANY, PROVIDENCE 1, R. I. • BRANCH WAREHOUSES AND DISTRIBUTORS FROM COAST TO COAST
PIPE FITTINGS • VALVES • PIPE HANGERS • PREFABRICATED PIPING • UNIT HEATERS • PIPING SPECIALTIES

Check 3375 opposite last page.

FAST, EASY, POSITIVE LINE BLINDING

Hamer Line Blind Valves





The famous 3-Bolt Hamer Line Blind Valve has set the standard for positive, dependable, economical line blinding in all industries.

FAST . . . because one man can reverse the spectacle plate from open to closed position in a matter of minutes.

EASY . . . because bar or handwheel operation provides tremendous leverage for spreading and tightening the hubs that hold the spectacle plate. Wedges, hammers, wrenches needed for spreading conventional flanges are eliminated.

POSITIVE . . . because nothing seals as securely and permanently as the solid spectacle plate clamped between the hubs of a Hamer Line Blind Valve.

Ask your nearest Hamer Line Blind Valve specialist about the multiple advantages of installing them wherever positive line shut-off is essential. Write for new Hamer Valve Catalog 60.

Handwheel operated Hamer Rigid Type Line Blind Valves are ideal for installation where conditions prevent spreading the line to reverse the spectacle plate.

WECO

WELL EQUIPMENT MFG. CORP.
HOUSTON, TEXAS
Division of CHIKSAN COMPANY *a subsidiary of* FOOD MACHINERY AND CHEMICAL CORPORATION

HV-2-60

fmc

WECO UNIONS

CHIKSAN SWIVEL JOINTS

HAMER LINE BLIND VALVES

HAMER PLUG VALVES

Check 3376 opposite last page.

For tough applications — Nickel-chrom alloy, small-diam tube

Contains 42% nickel, has high corrosion resistance

Small-diameter tube containing 42% nickel, 21% chromium and small amounts of molybdenum and copper has recently become available. The seamless product can be readily fabricated by either hot and cold working.

Tube sizes range from 0.012" to 1.125" OD. Wall thicknesses are from 0.0015" to 0.125".

The tube has excellent corrosion resistance. It withstands attack hot sulfuric, surfurous and phosphoric acid solutions. It also resists nitric acid, sea water, and cupric, ferric and mercuric salts (except chlorides).

Product is expected to find broad use as heating coils, spray headers and heat exchangers in chemical, pharmaceutical, food and allied industries.

(Further information about Ni-O-Nel tube may be obtained from Superior Tube Company, 1512 Germantown Avenue, Norristown, Pa.)

Check 3377 opposite last page.

Platinum metal halts H_2 embrittlement of tantalum

Combo sets up protective galvanic action

Hydrogen embrittlement of tantalum can be prevented by the attachment of small amounts of platinum metal. Recent experiments conducted along these lines have shown that tantalum in contact with platinum in an area ratio of up to 10,000 tantalum to 1 platinum creates a galvanic couple, which makes the tantalum immune to embrittlement for more than 1000 hrs in concentrated HCl at 374°F.

Ordinarily, tantalum would be embrittled in a few hours in this environment.

The platinum metal is af-

PUMPING MOLTEN CHEMICALS?
write TABER

Whatever your pumping needs .. why not put it up to Taber .. long experienced pump specialists. Vertical pump illustrated, 19,478, for pumping molten chemicals. Horizontal pump, 6043, handles black liquor, caustic, etc., in evaporator service; or transfers fluids under vacuum.

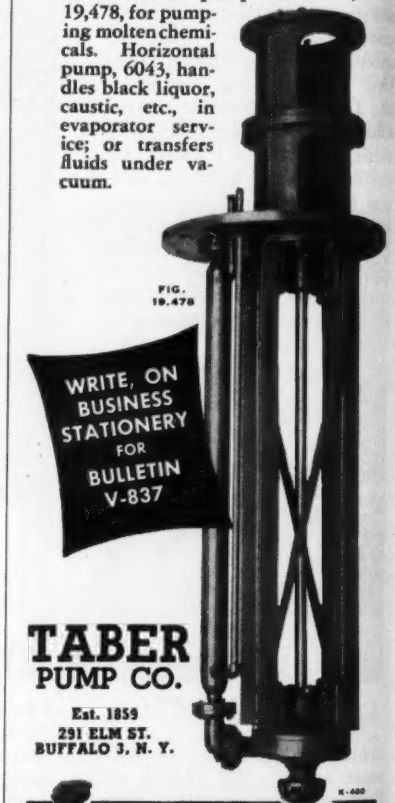


FIG. 19,478

WRITE, ON BUSINESS STATIONERY FOR BULLETIN V-837

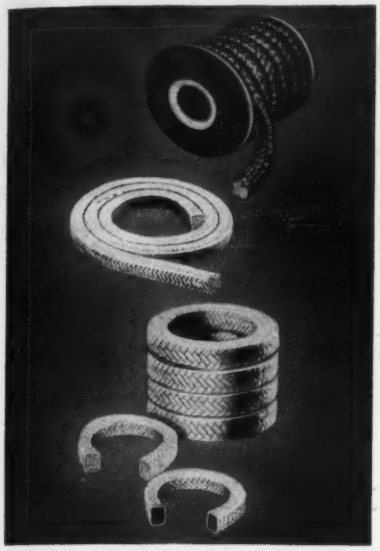
TABER PUMP CO.
Est. 1859
291 ELM ST.
BUFFALO 3, N. Y.

FIG. 6043

TABER

Check 3378 opposite last page.

CHEMPRO SQUARE-BRAIDED TEFLON* PACKINGS



Chempro Square-Braided Teflon Packings are tough, strong and chemically inert. They outlast ordinary braided packing many times over, holding together longer against even the strongest acid, alkali or organic solvent. Here are four popular Chempro Square-Braided Teflon packings:

STYLE No. 400 PACKING Constructed of pure Chempro tape, braided square without lubrication. For highly corrosive services where a lubricant is undesirable.

STYLE No. 400-F PACKING Resilient, square-braided packing of Chempro Teflon multi-filament yarn, without lubrication. For pump and valve applications in highly corrosive services where the packing must "give" to a certain extent.

STYLE No. 400-FI PACKING Square-braided packing of Chempro Teflon multi-filament yarn and impregnated with Teflon suspensoid. This dense packing was developed for gas and vapor services where other lubricated packings were not acceptable.

STYLE No. 400-FL PACKING Made by square braiding Chempro Teflon multi-filament yarn and externally lubricating with a non-hardening and non-melting lubricant. Recommended for high speed applications and highly corrosive services, from freezing to 350° F.

These Chempro Braided Teflon packings are available in all sizes in standard 1/16" increments from 1/8" to 3/4" square—in spool or coil forms. Can be cut to specific ring sizes, if desired.

Write for revised Bulletin CP-552.

*duPont trademark

CHEMICAL & POWER PRODUCTS, Inc.

9 Broadway, New York 4, N. Y.

Check 3379 opposite last page.

fixed to the tantalum by spot welding, sputtering or mechanical attachment. Corrosion rate of tantalum is not increased by the cantact. In some cases it even decreases. Moreover, the corrosion rate of the platinum is reduced to a negligible value.

Results of the experiments are expected to help broaden use of tantalum in the chemical industry — especially at higher temperatures and in corrosive conditions where embrittlement has been a problem.

(Platinum-tantalum experiments were conducted at Union Carbide Metals Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, New York.)

NEW LITERATURE

Corrosion Control

Cold-applied coatings are discussed in series of three brochures. Materials include an inhibitive primer, modified coal-tar emulsion coating and a heavy-bodied emulsion which combines good protection with excellent adhesive properties. Booklets T-197-1-3 — Tar Products Division, Koppers Company, Inc.

Check 3380 opposite last page.

How PVC is helping whip corrosion in various industries is told in 10-page case-history folder. Six specific examples are reviewed. Boltaron PVC Case History File Folder — Bolta Products Division, The General Tire & Rubber Co.

Check 3381 opposite last page.

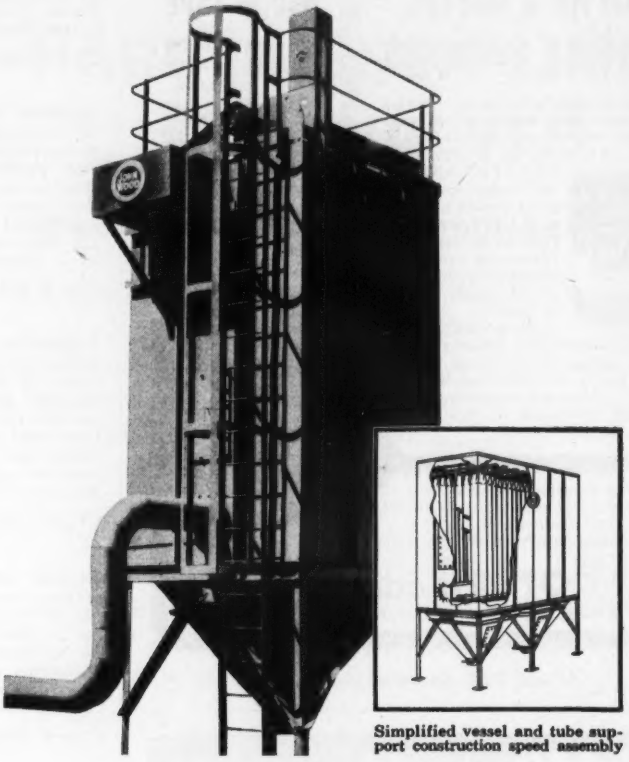
Corrosion-resistant equipment for chemical, pharmaceutical, food and cosmetic processing is reviewed in series of four bulletins. Included are pulp and storage tanks and other custom-designed vessels. Buls LM-300, 500, 900 and 1200 — Lee Metal Products Co., Inc.

Check 3382 opposite last page.

How to install plastic pipe is told in 10-page brochure. Text and illustrations cover recommended practices for cutting, connecting, installing, testing and backfilling. Bul TR-270A — Johns-Manville Corporation.

Check 3383 opposite last page.

New Ideas On Dust And Fume Control



Simplified vessel and tube support construction speed assembly

New Products:

John Wood High Efficiency Fabric Filter

John Wood Fabric Filters are engineered for 99.9% efficiency in addition to trouble-free operation. They are the result of a program to design equipment for fully effective removal of all dry dusts at elevated operating temperatures.

An extremely varied group of filter sizes, shapes and types is available in capacities from 100 CFM to 48,000 CFM. Larger volumes are handled through a combination of units. John Wood automatic reverse flow mechanisms or shaker assemblies assure proper and gentle cleaning of fabric. Tubular or envelope bags are made of cotton, orlon, dacron, nylon or glass to meet any requirement.

New Engineering: John Wood Fabric Filters are but part of the complete line. Other equipment includes Interphase Reaction Scrubbers, Multi Cyclones, Involute Cyclones, Venturi Scrubbers and combination units. New designs are now under development.

New Service: John Wood Air Pollution Control is fully programmed from analysis of existing conditions to equipment installation. Frequently economies result that make the installation self-liquidating through lower maintenance and replacement costs.

Write for engineering assistance or specific product information. An air pollution preliminary analysis kit is available without obligation.

AIR POLLUTION CONTROL DIVISION

JOHN WOOD COMPANY

5 NICOLET AVENUE FLORHAM PARK, N. J. TUcker 7-3200

Check 3384 opposite last page.

You'll be amazed at NoDrip Plastic Coating savings

Instead of using expensive absorbent insulation or multiple coats of paint on cold pipes, tanks and air ducts, switch to NODRIP PLASTIC COATING to *permanently* stop condensation drip and corrosion! Cost is far less, application fast and simple. Applies like plaster with trowel or brush.

Non-toxic, odorless, non-flammable. Resists acids, alkalis, brine solutions or vapor. Use on metal, concrete, brick, plaster, tile. Stops condensation drip, rust and corrosion. 1 and 5 gal. cans or 55 gal. drums.

for smaller pipes use NoDrip TAPE

Pliable, cork-filled, self-adhering tape. No tools or fasteners.

Forms 100% vapor- and moisture-proof jacket, even around unions, tees, angles, valves.

At all leading hardware, mill supply and plumbing jobbers. For full information and technical handbook write

Mortell COMPANY
530 Burch Street, Kankakee, Ill.

Check 3385 opposite last page.

SLASH washing costs

with John BEAN AQUABLAST

IS YOUR CLEANING PROBLEM ONE OF THESE...OR SIMILAR?

- Processing tanks
- Metal rust or scale
- Heat exchanger tubes
- Towers, Structures
- Tube bundles
- Vessels
- Chemical residues

One man with AQUABLAST equals a crew of men using ordinary water pressures. The important difference is that water, discharged at 600 lbs. pressure from an Aquablast gun, cuts through caked dirt, hardened deposits, gummy residues or accumulated grime like magic! John Bean Aquablast Washers are complete, motor driven pumping units for use with 1 to 3 guns.

Send information request form — today!

John BEAN
DIVISION OF
FOOD MACHINERY & CHEMICAL CORP.
INDUSTRIAL SALES DEPARTMENT
LANSING MICHIGAN • SAN JOSE, CALIFORNIA
fmc

Check 3386 opposite last page.

CORROSION CONTROL

Corrosion-resistant tube fittings are depicted in four-page folder. The flareless units are made of type-316 stainless steel. Bul 4323Bl — Parker Fittings & Hose Division, Parker-Hannifin Corporation.

Check 3387 opposite last page.

Technical data booklet, consisting of 25-pages, details corrosion-resisting properties of Penton. Charts and graphs illustrate chemical composition and structure of this chlorinated polyether. Physical, mechanical and thermal properties are also reviewed. Penton Booklet — Hercules Powder Company.

Check 3388 opposite last page.

Engineering specifications of corrosion-resistant valves are tabulated in 16-page bulletin. Cross-sectional drawings illustrate over 45 different valves. Adaptable features and materials from which valves can be manufactured are also covered. Bul 7 — Alloy Steel Products Co.

Check 3389 opposite last page.

Revised 28-page booklet deals with corrosion-resistant alloy capable of withstanding temperatures up to 2000°F. Latest information on resistance welding is included. "Multimet Alloy" — Haynes Stellite Company, division of Union Carbide Corporation.

Check 3390 opposite last page.

Custom coating service for products and equipment is reviewed in four-page brochure. Various plastic materials, including Penton and nylon, can be applied. Bul "Whirlclad Custom Coating Service" — Whirlclad Division, The Polymer Corporation.

Check 3391 opposite last page.

Technical data regarding heat, corrosion, and abrasion resistant alloy steels is contained in 24-page catalog. Chemical composition and mechanical properties are listed for approximately 50 alloys. Cat 175 DS — ESCO Corporation.

Check 3392 opposite last page.

Polyethylene tanks in sizes up to 55 gal, are considered in two-page bulletin. Physical data and price information are included. Bul "Molded Plastic Tanks" — American Agile Corporation.

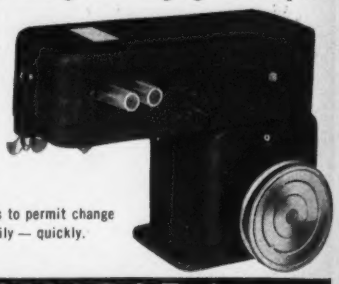
Check 3393 opposite last page.

Advantages of glass pipe for handling chemical wastes is explained in revised 16-page catalog. Details are also presented about available fittings. Photos and schematic drawings are included. Bul PE-30 — Corning Glass Works.

Check 3394 opposite last page.

NOW A LOW COST METERING PUMP FOR SULPHURIC ACID AND OTHER STRONG OXIDIZING AGENTS

Now a special formulation of Hypalon makes the dependable SIGMAMOTOR Pump applicable for metering sulphuric acid or other strong oxidizing agents. Liquid is forced through Hypalon tubing by wave-like action of steel fingers. Never contacts metal.



Model T6SH opens to permit change of tubing easily — quickly.

SIGMAMOTOR Inc.
18 NORTH MAIN STREET • MIDDLEPORT, NEW YORK

Check 3395 opposite last page.

BETTER PERFORMANCE

• *Less slippage*
• *Longer life*

Pumcup designs include the conventional and 45° bevel types in a full range of sizes for all reciprocating pump and cylinder requirements.

Try Darcova Pumcups in your reciprocating pumps and cylinders, and you too will realize what a *big* difference they make.

Because they are "engineered" for their job—in precisely controlled textures, shapes and types—and are noted for outlasting other packings at least 3 to 1! Why not get the advantage of this tremendous saving in maintenance and down-time?

Pumcups are available in 100% Nylon as well as other texture-engineered compositions. Send today for Bulletin No. 5903.

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

DARCOVA
TRADE MARK
PUMCUPS

Check 3396 opposite last page.

THAT'S INTERESTING

Washable wool

Shrinkproofing coating can be applied to wool by means of a chemical treatment developed by USDA scientists.

Wool fibers are covered with a durable ultrathin coating of a ployamide—chemically similar to nylon.

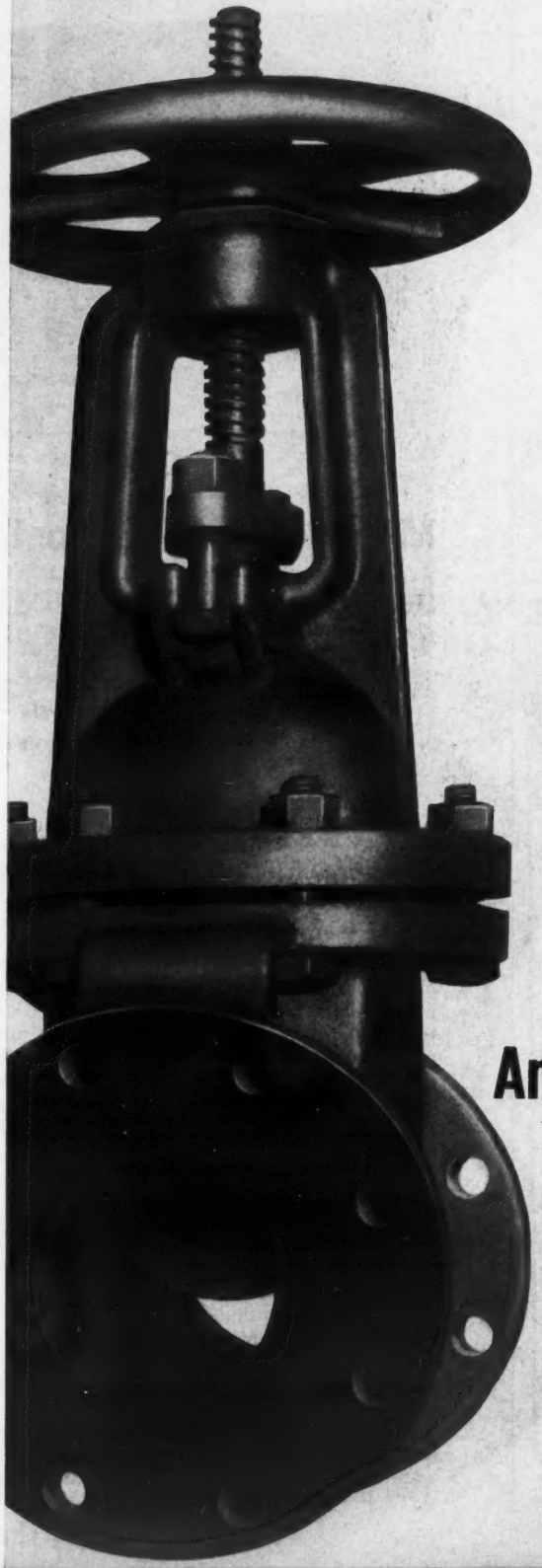
Treated fabrics retain wool's soft texture, yet can be washed repeatedly without shrinking and dry without wrinkling.

Crops in desert

Scientists, seeking ways for utilizing desert lands for growing crops, have isolated several chemicals which enable heat-resistant plants to survive.

A variety of peas has been made heat-resistant by the chemical feeding method. Riboflavin, adenine, pyrimidines and gibberellic acid increase resistance.

For more information on product at right, specify 3397 see information request blank opposite last page.



ACE

HARD RUBBER-LINED GATE VALVES

FULL PROTECTION AT REASONABLE COST

Corrosive liquids never get near the metal in this long-wearing gate valve. All wetted parts are protected by Ace hard rubber, noted for enduring resistance to acids, bleaches, and a host of chemicals. Not just a thin coating, but a thick, homogeneous lining that's calendered layer over layer and applied with permanent bonding techniques to make weak spots impossible.

Precision-machined disc and seat remain drip-tight even after long use. Operation is smooth, low friction. (Wet hard rubber is an excellent bearing material.) Can be packed while open under full pressure. Rated 125 psi. Std. A.S.M.E. flanges. Stocked 2″ to 8″; larger sizes to 16″ on order.

Ask to see the Ace Gate Valve, and ask its price. It's economical enough to replace many special valves in your plant . . . and reliable enough to make high-priced alloy metal valves an unnecessary luxury. Write American Hard Rubber Company today.

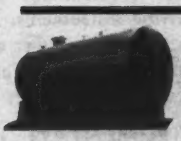
Ask for helpful Piping Systems Data Bulletin CE-51/52

CHEMICAL EQUIPMENT DEPARTMENT

ACE

American Hard Rubber Company

ACE ROAD, BUTLER, NEW JERSEY



Rubber-lined steel tanks and special equipment. Also custom compounds for field application **Bul. CE-53.**

Rubber-lined steel pipe . . . combines strength of steel with chemical resistance of Ace Hard Rubber. **Bul. CE-51/52.**

Acid pumps, centrifugal and gear types, protected by Ace Hard Rubber. Full line to 350 gpm. **Bul. CE-55.**

Hard Rubber pipe and fittings, including heat-resistant Tempron for handling hot corrosives. **Buls. CE-51/52 and 96.**

HIGH-PRESSURE FLOWS

BROOKS CAN METER THEM AS HIGH AS 100,000 PSI! Brooks rotameters work well under pressure. Right now there are several operating around the clock at 40,000 psi, in process lines ranging from ½ to 2 inches. Operation has been very satisfactory. Even on heavily pulsating flows. (The meters have built-in provision for pulsation damping. It is simple. And very effective.) ■ Brooks high-pressure meters can be supplied with either electric or pneumatic transmitting extensions. Both are compatible with most receiving instruments. Both use the Brooks magnetic position converter, the most reliable transducer of its kind. ■ If you have a high-pressure metering job, ask us about it. We can probably give you exactly what you need. And at a price somewhat lower than you'd expect to pay. Design Specification Sheet 3613 will give you more information.

BROOKS INSTRUMENT CO., INC.
5504 W. VINE ST. • HATFIELD • PENNSYLVANIA

Brooks Instrument Canada Limited, Scarborough, Canada • Brooks Instrument Company, S. A., Fribourg, Switzerland • Brooks Instrument Nederland, N. V., Veenendaal, Netherlands

BA 2360

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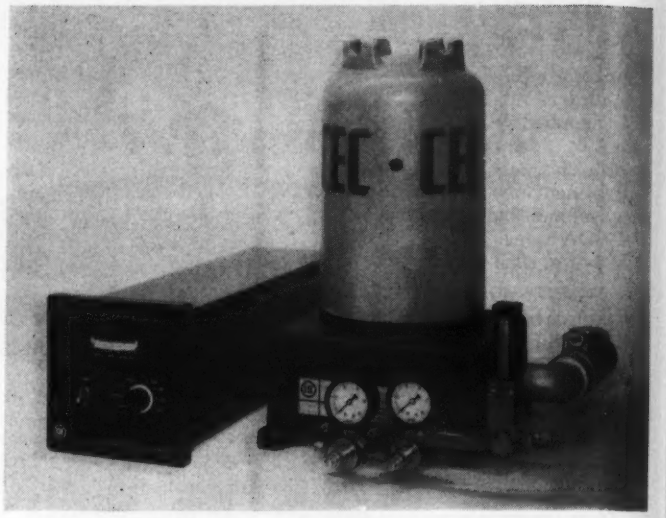


Liquid process moisture monitor consists of analyzer (right) and control unit

Measures moisture continuously in organic process stream

New method used — after careful comparison with classic batch analysis — to assure that liquid product meets "dryness" specs

NEED FOR better performance data on organic-liquid process streams led Dow Chemical to search for equipment to measure moisture on a continuous basis.

Measurements had been made on batch samples by well-known methods. When the need for closer measurement was established, Dow engineers experimented with a glass/cloth cell for measuring moisture based on surface conductivity. *Qualitative* measurements were achieved: The apparatus produced an *indication* of water in the liquid stream at ppm levels. However, *quantitative measurements* were beyond the capabilities of this equipment.

An evaluation of a Liquid Process Moisture Monitor, based on an electrolytic principle, was made to determine its applicability for continuous, accurate ppm measurements of water in the stream.

In this evaluation the instrument was operated with samples having varying amounts of water concentrations. Readings were compared with Karl Fischer titrations of the sample stream. These were well within 10% of the analytical titrations. Furthermore, tests were made to determine the effects caused by variations. (See accompanying table.)

Following evaluation, the unit was installed at Dow's Pittsburg, California operations on an organic-liquid process stream. Continuous water-content measurements permitted correction of a "too-wet" condition in the product.

How it works — The unit is packaged in two convenient units: analyzer and control. Former is housed in a weather-tight, explosion-proof conduit, and may be installed in Class 1, Group D, Division 1 hazardous locations. Control unit, designed for panel mount-

How the Monitor Checked Out

Instrument Accuracy

Instrument Reading	Karl Fischer Analysis
96 ppm	100 ppm
180 ppm	172 ppm

Effect of Sample Pressure (*Standard Sample*)

Sample pressure	Instrument Reading
3-6 psig	192-198 ppm
12-15 psig	201 ppm

Effect of Stripping-Gas* Flow Rate (*Dry Nitrogen*)

Flow rate	Instrument Reading
80 cc/min	192 ppm
234 cc/min	192 ppm
342 cc/min	198 ppm

Effect of Line-voltage Variation (*Constant Sample*)

Line Voltage	Instrument Reading
75 v	66 ppm
100 v	66 ppm
135 v	67 ppm

*Removes the water from sample stream, as described in article.

ing, is conduit-connected to the analyzer and may be located as much as 500 feet away from that unit.

Control unit contains attenuation control, pump switch, and a meter which may be calibrated in ppm either by weight or by volume. Output is also provided in the control unit for use with any potentiometer recorder having a range extending from 10 to 100 mv DC.

In operation, water is measured electrolytically by an electrolysis cell. Since the cell contains a desiccant which would be washed away by liquids, water is stripped from the liquid sample with a dry gas, and passed into the cell in vapor form.

Stripping is performed in a falling-film column where a stream of dry air or nitrogen flowing upward removes all water from a descending film of sample, continuously metered into the column. A filter removes any entrained sample-liquid droplets before the gas passes to the cell.

Measurement of moisture in the cell is accomplished when the water, carried by the gas, reacts with a desiccant coating connecting two oppositely charged DC electrodes to form an electrolytically conductive acid. As long as water is present in the dessicant, current flows between the electrodes. Current continuously regenerates the desiccant by electrolyzing the water, and the amount of electrical current flowing is directly proportional to the absolute quantity of water present.

(Liquid Process Moisture Monitor is a product of Consolidated Electrodynamics Corporation, Subsidiary of Bell & Howell Co., 360 Sierra Madre Villa, Pasadena, Calif.)

Check 3399 opposite last page.

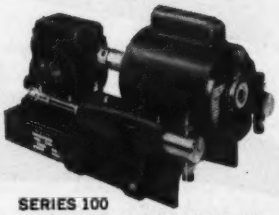
ACCURATE CHEMICAL FEEDING

from .65 gph to 1624 gph

SERIES 200
Self-contained lubricating system—no downtime for lubrication. E.Z. Clean Cartridge liquid end simplifies maintenance. Simplex models pump up to 812 gph at a maximum pressure of 10,000 psi. Duplex models double that capacity.

American controlled capacity proportioning pumps have repetitive metering accuracy of plus or minus 1%, when operating between 10% and 100% of capacity. Feed precisely metered fluids or slurries in virtually all ratios, with flow, temperature, pressure, conductivity, pH and other controlled process variables.

- interchangeable liquid ends
- spherical self-aligning bearings on crank and crosshead handle greater radial and axial thrust loads
- crossheads of hardened and ground steel ride on cast iron
- nylon dust covers protect bearing surfaces
- NEMA frame motors
- heavy duty reducers



SERIES 100
Simplex models pump up to 13.10 gph at a maximum pressure of 1000 psi. Duplex models double that capacity.

AMERICAN® METER COMPANY
INCORPORATED (ESTABLISHED 1836)
pump division
13500 PHILMONT AVE., PHILADELPHIA 16, PENNA.

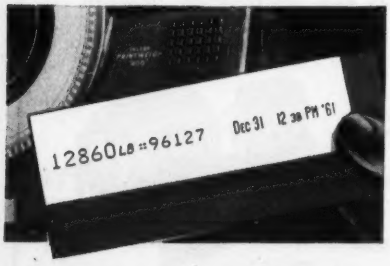
Check 3400 opposite last page.

...When Management Puts The Spotlight on WEIGHING

PRINTWEIGH® RECORDS: a Major Cost Control Tool

Materials become money . . . on your scales. Weight records directly affect costs, quality control, inventories and customer billing. That's why it pays to put the spotlight on weighing . . . and make sure you have the right TOLEDO scale at every weighing point.

A close look at weighing is especially called for if you've made changes in plant layout, materials handling methods, or inventory controls. In any of these areas, scales that don't fit the job can bottleneck operations, infect weight records with costly errors.



Complete Printed Weight Records with TOLEDO PRINTWEIGH "400"

Prints complete weight records on tickets, sheets or strips. Transmits weight data to remote locations where it is recorded by office machines, if desired. Ask for Bulletin 2017.

We'll be glad to help you evaluate weighing efficiency in your operations. A few minutes at each weighing station will put the spotlight on scale capacity and location, dial visibility, platform size and height and other important factors. Send for Bulletin 2036. TOLEDO SCALE, Division of Toledo Scale Corporation, Toledo 12, Ohio.

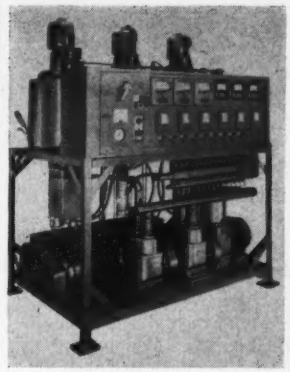
(Toledo Scale Co. of Canada Ltd., Windsor, Ont.)

SERVICE Factory-Trained 500 Cities

TOLEDO®

Headquarters for Weighing Systems

Check 3401 opposite last page.



New Squibb still

. . . is three complete distillation units coupled in series. They are capable of acting as preheaters, degassers and strippers. Unit will recover low-boiling components continuously, as well as distilling major compound. Automatic operation is provided by recorders monitoring each control factor. Still is effective in processing materials of molecular weight 250 to 4000 in capicities of 10 to 300 lb/hr.

(Rota-Film molecular still is product of Arthur F. Smith, Inc., 311 Alexander St., Rochester 4, N.Y.)

Check 3402 opposite last page.

Thermal-conductivity meter includes alarm system

A recently developed thermal conductivity gage is suited for use as continuous or intermittent gas-analyzer. It reads directly in relative thermal conductivity.

The gage is available with contact meter relay control units which automatically alarm, protect, or control a system should gas change beyond pre-set levels. Control is adjustable throughout range.

Thermal-conductivity cell will withstand overpressure to 3000 psig without damage. Dial face is calibrated in two ranges, 0.35-1 and 1-7.

(Thermal conductivity gages is product of Hastings-Raydist, Inc., Hampton, Va.)

Check 3403 opposite last page.

PALMER

Mercury Actuated Dial Thermometers now in three types to suit any requirements

PALMER
PATENTED
FULL 4½" DIAL FACE. Stem can be placed at any angle and case can be rotated to any readable position.
1 RIGID STEM DIAL THERMOMETER tapered bulb, interchangeable with standard industrial thermometer separable socket. (As illustrated above.)
2 WALL MOUNTED DIAL THERMOMETER with flexible connecting armor. Case adjustable to easy reading position.
3 FLUSH MOUNTED DIAL THERMOMETER for panel mounting with flexible connecting armor.
ALL THREE TYPES HAVE A FULL 4½" DIAL FACE.

■ **for accuracy:** Mercury actuated . . . Compensated by Invar. Guaranteed Accurate 1 scale division. ■ **for angularity:** Can be adjusted to most readable position at any angle desired. ■ **for readability:** Bold Black Numbers . . . 11" of scale Reading Dial face can always be placed in easiest readable position. ■ **for interchangeability:** Also specify "PALMER" Separable sockets as they are interchangeable for Dial or Industrial type Thermometers.

PALMER

PALMER THERMOMETERS, INC.
Norwood Ave., Cincinnati 12, Ohio
MFRS. OF INDUSTRIAL LABORATORY, RECORDING AND DIAL THERMOMETERS

Check 3404 opposite last page.

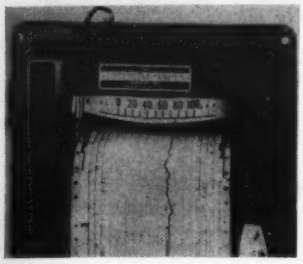
Six-event recorder takes any AC, DC data

Uses: Simultaneous measurement of such quantities as pipeline pressure and valve operation.

Features: Recorder will accommodate any data which can be expressed as an AC or DC voltage, AC or DC current (including DC milliamperes and DC microamperes).

Description: Recorder combines two functions in single graphic instrument. Six of its pens — three to left and three to right in photo — record events, while central analog pen records effect of these events on a given quantity.

Recorder comes in case which measures 10¾" wide,



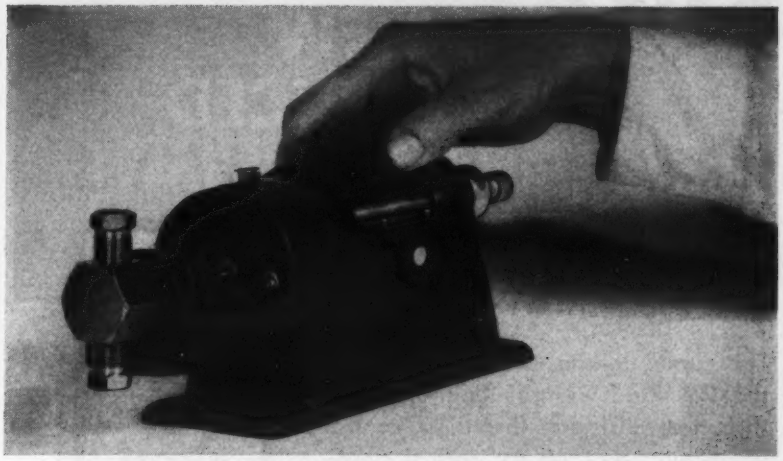
16" high and 11" deep. Analog and event data are recorded on single six-inch-wide strip chart.

(Analog-Event Recorder is product of The Esterline-Angus Instrument Company, 1201 Main St., Speedway, Ind.)

Check 3405 opposite last page.

"Heck, I just ran out for a minute for a smoke!"

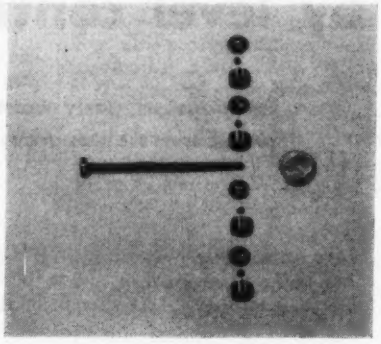
how to meter small quantities of liquid accurately



THERE'S no basic change in the physical properties of a liquid whether you pump large or small volumes. But as the volume being pumped approaches the milliliters per hour (ml/hr) range, several constant characteristics of liquids tend to become serious problems. Metering success depends on how well these problems are solved by pump design and operating practice.

Compressibility:

All liquids are compressible, but so slightly that there is rarely much cause for concern. In small volume metering, however, the 0.027% reduction in volume of water which accompanies each additional 100 psi pressure can represent a 0.3% loss in pumping efficiency. Thus the existence of high or fluctuating discharge pressures *must* be considered when choosing a micro pump.



Entrapped air:

Bubbles can be troublesome even in high capacity controlled volume pumps. But when you're metering at the rate of 1/60 *ml per stroke* to 0.3% accuracy, a bubble can spell disaster. Good pump design can minimize the bubble problem by speeding bubbles through the liquid end in a very few strokes, but only good pumping practice can eliminate it. In our experience, there is no substitute for a deaerator in the line.

Viscosity:

Low viscosity liquids tend to pass between any but the most perfectly mated ball checks and seats. Ball seating techniques recently introduced by Milton Roy have eliminated this problem, however, and extended the number of liquids that can be accurately pumped in small volumes. For example, a miniPump® is now successfully pumping 85 ml/hr of cyclohexane against a discharge pressure of 1,000 psi to an accuracy of ±0.6%.

Minute volumes also impose tight specifications on the pump itself. Plungers, balls, and seats must be finished to a degree of near perfection. Parts are inspected under powerful microscopes for any sign of imperfections. Proper mating of balls and seats is so critical that a rigorous functional test is necessary.

Solving these unusual problems demands such special equipment as the Milton Roy miniPump, *and* special pumping practices. Together they permit numerous metering jobs not otherwise possible. MiniPumps are standard equipment wherever small volumes of expensive or dangerous liquids are to be accurately metered into large process streams: perfumes into soap, dyes into cheese, odorants into natural gas, and hydrazine and other amines into boiler water. MiniPumps have also proved themselves in the chromatographic analysis of amino acids, feeding influent buffers to the columns and accurately introducing ninhydrin reagent to the effluent.

If precision pumping of small volumes of liquid is one of your problems, look to Milton Roy's 25 years of experience for your most economical solution. For more detailed information on miniPumps, write for Bulletin 1257-1. Milton Roy Company, 1300 East Mermaid Lane, Phila. 18, Pennsylvania.

milton Roy
CHEMICAL INSTRUMENTATION SYSTEMS

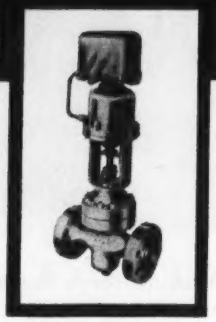
Controlled Volume Pumps • Quantichem Analyzers
Chemical Feed Systems • pH Instruments

Check 3406 opposite last page.

GENERAL KINETICS
DE VAR

NOW AVAILABLE

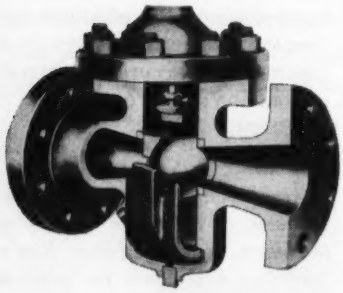
NEW LOW PRICED



The same unique design that made the P-K Paul Venturi Control Valve the most efficient throttling control valve ever devised for critical applications has been incorporated into the new Series G line of P-K Paul Control Valves.

IN ADDITION TO *LOWER COST*

You Get:



- Higher Flow Capacity
- Rangeability Over 100 to 1
- Positive Shut-Off
- Non-Turbulent Flow
- Low Operating Thrust
- Self-Purging Action
- Resistance to Erosion and Abrasion

Write today for 16 page catalog GV102

General Kinetics Corporation

197 South Van Brunt Street • Englewood, New Jersey

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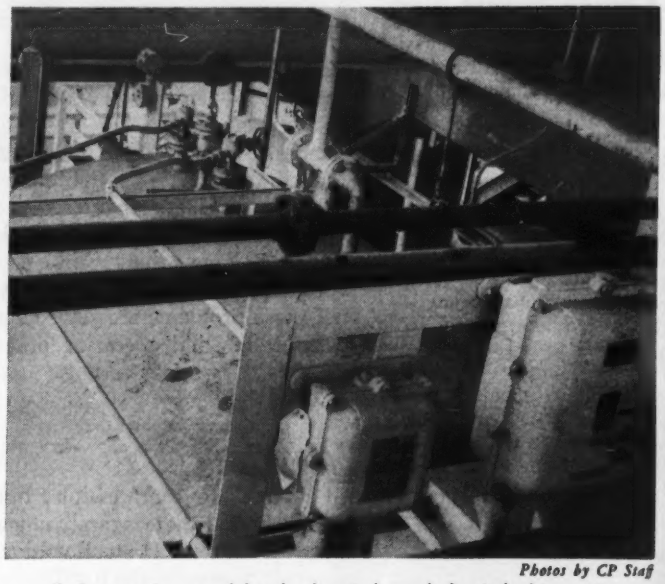
LICENSEE IN THE EASTERN HEMISPHERE:
JAMES GORDON VALVES, LIMITED • ROCHESTER • KENT
A MEMBER OF THE ELLIOTT-AUTOMATION GROUP

Check 3407 opposite last page.

PROCESS INSTRUMENTATION and LABORATORY APPARATUS



Photos by CP Staff

Each operating vessel has level-control panels located above catwalk for easy accessibility

Foaming problem nipped in bud by level control

Functions as early-warning device to correct problem as well as prevent latex-foam damage

KARL ROBE, Editor West
with **JACOB GROENEWEGEN,**
Instrument Engineer
Shell Chemical Company
Torrance, Calif.

WHEN A VESSEL of freshly made latex foams over, clean-up involves considerably more than mopping up. Pipes plug; the operating vessel must be shutdown, manhole removed and an expensive cleaning job undertaken.

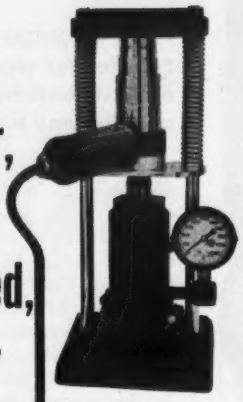
At Shell Chemical Company's Torrance, California, plant, foaming is a rare occurrence. When it does happen, however, it is nipped in the bud before it reaches the damaging point.

Shell has added two capacitance level controls to each of the four operating vessels in which foaming can occur. First capacitance probe is a maximum-level fail-safe type which shuts off input if liquid level reaches to within 24" of top of tank.

A NEW SOLUTIONS FEATURE

Second is also a high-level fail-safe version, with sensitivity adjusted to detect latex foam. This probe projects downward from top inside the vessel, and immediately shuts off the inflow if the foam rises

If you process granular, ground, powdered, loose or shredded materials



This G-6 by Moisture Register can save you production costs and cut storage losses.

With the G-6 you save lab time. You can make critical moisture tests in just one minute, with a practical accuracy to 0%. No skilled help or special instructions needed, because the right count is registered on an easy-to-read dial—for up to 95% more tests per hour.

The G-6 can be used anywhere. High hydraulic pressure assures a completely homogenous sample. And, it's easily calibrated for many materials such as ammonium nitrate, ammonium sulphate, toilet soaps, sulphur, calcium carbonate, sodium bicarbonate, magnesium, urea, wood shavings, grains, and many others.

The G-6 is fully guaranteed for one year for all parts and workmanship. Send your order today, or ask for full information. Net Shipping Wt. 60 lbs. $445.00 F.O.B. Alhambra, Calif.

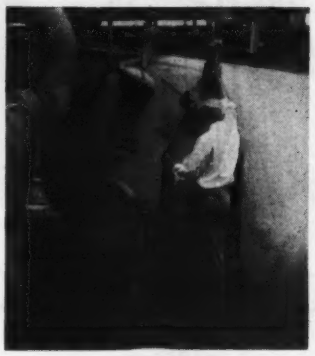
ELECTRONIC MOISTURE REGISTER INSTRUMENTS

MOISTURE REGISTER CO.
DEPT. CP, P.O. BOX 910
ALHAMBRA, CALIFORNIA

Check 3408 opposite last page.

to this point in the vessel.

Capacitance change is converted to pneumatic signal which opens or closes air-actuated inflow flow-control valves. At the same time, a howler (in control-room panel) sounds an alarm to inform personnel of foaming problem and its location. Probes are



Latex vessels are each equipped with sight glass and internal flood light for visual inspection

Teflon-coated, and as easy to maintain as inside surface of vessels.

With all vessels equipped with foam detectors, not only has messy clean-up after foam-over been eliminated, but also personnel have closer operating control.

The probe and howler constitute an early-warning detection device which allows immediate appraisal of operating conditions and rapid correction of the problem.

(Level-Set control units are product of Robertshaw-Fulton Controls Company, Santa Ana Freeway at Euclid Ave., Anaheim, Calif.)

Check 3409 opposite last page.

Synchro pressure transmitters (608) and repeaters (609) are subjects of two bulletins giving mechanical, dimensional, pneumatic and electrical data on all units. Buls S-608 and S-609—Servonic Instruments, Inc.

Check 3410 opposite last page.

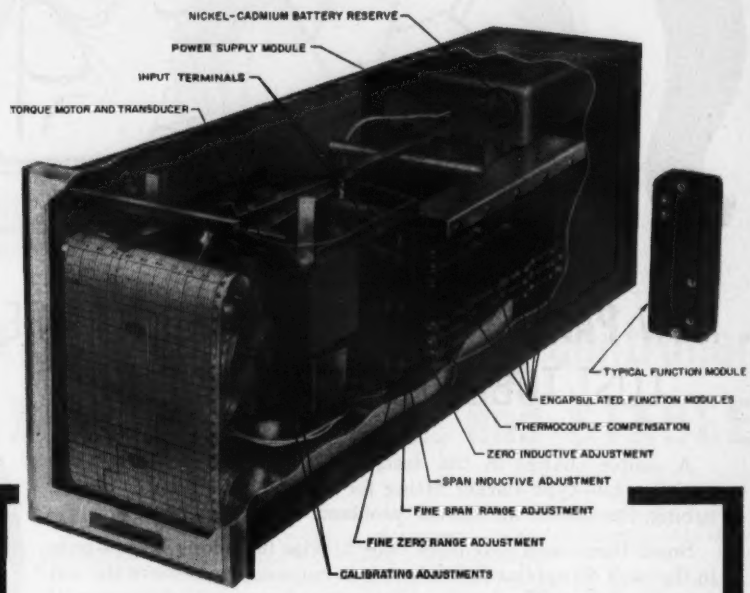
Recording instruments of all types are reviewed in four-page Form 960-20M — The Esterline-Angus Company.

Check 3411 opposite last page.

GENERAL KINETICS DE VAR

NEW TRANSISTORIZED MINIATURE RECORDER OFFERS

DC INPUT ISOLATION AND NOISE-FREE DC OUTPUT



The unique DE VAR potentiometer/receiver recorder is particularly suited for Strain-Gage Transducers, Thermocouples and Resistance Bulb Elements. The isolated input circuit rejects high common-mode noise without resorting to input balancing. The DC output signal is sufficiently noise-free to feed data loggers or computers. In addition, a low noise, high frequency carrier signal is available for drift-free operation of controllers and alarms.

- Exclusive inductive zero and span adjustment — continuously variable from 0-5 mv to 0-50 mv.
- Complete solid state circuitry — including unique transistor chopper.
- Battery reserve — eliminates costly down time.
- Full scale rectilinear writing — with 1, 2, or 3 pens.

Our Technical Bulletin R-301 describes the most advanced miniature recorder now available —

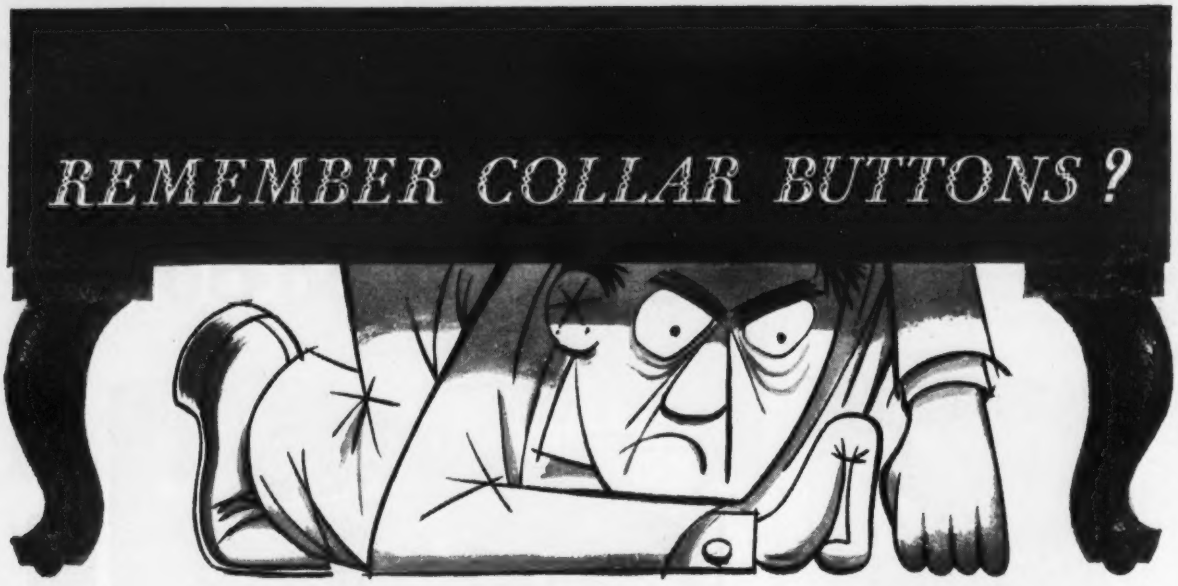
Write today

DE VAR SYSTEMS INC.
494 GLENBROOK ROAD
GLENBROOK, CONNECTICUT

A DIVISION OF GENERAL KINETICS CORPORATION

LICENSEE IN THE EASTERN HEMISPHERE:
DE VAR LIMITED • LONDON
A MEMBER OF THE ELLIOTT-AUTOMATION GROUP

Check 3412 opposite last page.



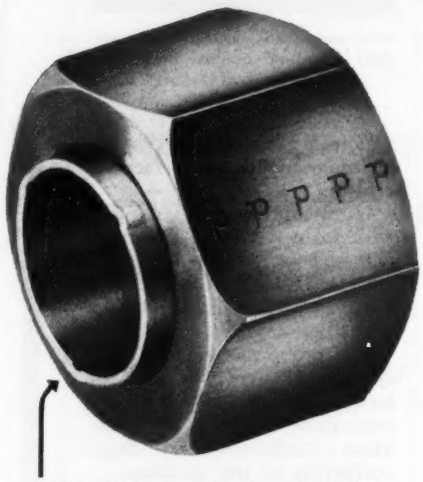
NOW **PARKER** HAS ELIMINATED A MORE SERIOUS ANNOYANCE ...LOST TUBE FITTING FERRULES!

A simple change in the design of Parker "Intru-lok®," the positive, bite-type Parker fitting for copper, aluminum or plastic tubing, has solved an age-old problem.

Small three- and four-piece tube fittings have long been a pain in the neck on applications where it is necessary to remove the nut from the fitting. The ferrule(s) fall out and promptly disappear. If and when found, they often get put in backwards. Sometimes they never get put back at all. Result, in either case: a leaking joint.

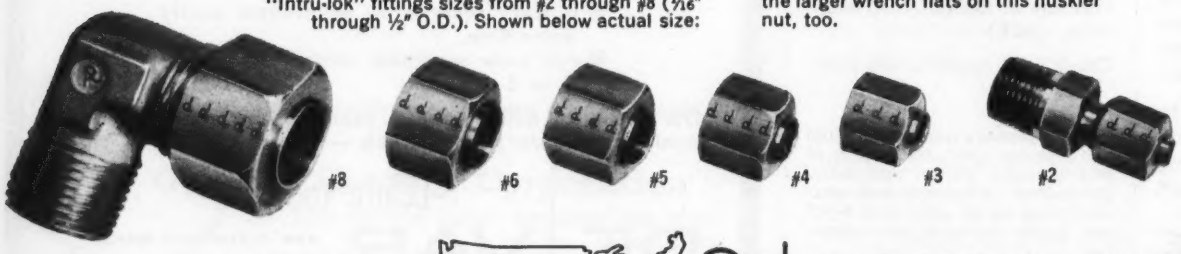
Now Parker has developed a snap-in, captive ferrule for "Intru-lok." You can take it out of the nut, "on purpose," but you can't drop it out accidentally.

You get all the leakproof safety of a three-piece fitting with positive "bite." You also get the convenience, the quick, easy assembly of a two-piece fitting. The easiest fitting to install has been made even easier. Write for new "Intru-lok" dimensions and prices today.



Three "detents" hold the "tail" of the new ferrule in the nut. Also, the larger hole in the nut makes tube bends closer to the fitting possible. Note the larger wrench flats on this huskier nut, too.

The new nut with captive ferrule is available on all "Intru-lok" fittings sizes from #2 through #8 (1/16" through 1/2" O.D.). Shown below actual size:



Parker FITTINGS AND HOSE DIVISION
17325 Euclid Avenue • Cleveland 12, Ohio
PNEUMATIC AND HYDRAULIC SYSTEM COMPONENTS
3278-PH
EUROPEAN DIVISION • PARKER-HANNIFIN N.V. • SCHIPHOL • THE NETHERLANDS

Check 3413 opposite last page.

▶ A NEW SOLUTIONS ARTICLE

Colorimeter stands guard against contamination of boiler and turbine

A continuous automatic colorimeter is protecting a $5 million boiler and turbine installation from sugar contamination at the Crockett Refinery of California & Hawaiian Sugar Refining Corp.

The instrument automatically monitors for sucrose traces from 0 to 80 ppm on stream. In this manner boiler installation is guarded against damage which would result if appreciable quantities of sugar entered the boiler along with returned condensate.

Readings are graphed automatically on chart recorder. The colorimetric analyzer runs continuously without attendant being present. Plant personnel are thus released for other important duties.

Success of the system has been such that the California sugar processor has added a laboratory model for use in making invert sugar analyses and for automation of other analytical determinations in laboratory.

Essentially, technique for automating colorimetric determinations using the instrument follows same path of chemist working by hand. Equipment modules automate all steps — sample measuring, mixing, purifying, processing, comparing, charting — integrating separate phases into one continuous-flow system with permanently recorded results.

(AutoAnalyzer is product of Technicon Controls, Inc., Chauncey, N.Y.)

Check 3414 opposite last page.

Temperatures to 1000°C OK for spectrophotometer

A recording spectrophotometer has been designed for analysis of samples with temperatures to 1000°C and greater. This one has cell area which will accommodate a variety of special cell arrangements.

Unit is thus well suited for fused-salt studies, photoreac-

tion measurements, Zeeman-effect measurements, high-pressure work, radiation studies and work with odd-shaped samples.

Range of spectrophotometer is 1860A to 2.65 microns; resolution, 1.5A over most of UV-visible range (4A in near-IR range); stray light, less than 0.001% over most of range (0.1% at range limits).

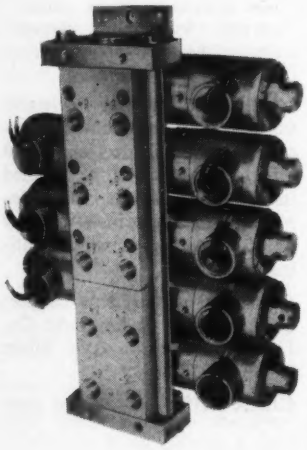
(Cary Spectrophotometer 14H is product of Applied Physics Corporation, 2724 S. Peck Rd., Monrovia, Calif.)

Check 3415 opposite last page.

Many valves function as one unit

Multiple subplates permit operation of many valves to function as one unit. They offer unlimited manifold mountings of solenoid valves in one location by using modular design technique of unit-by-unit expansion.

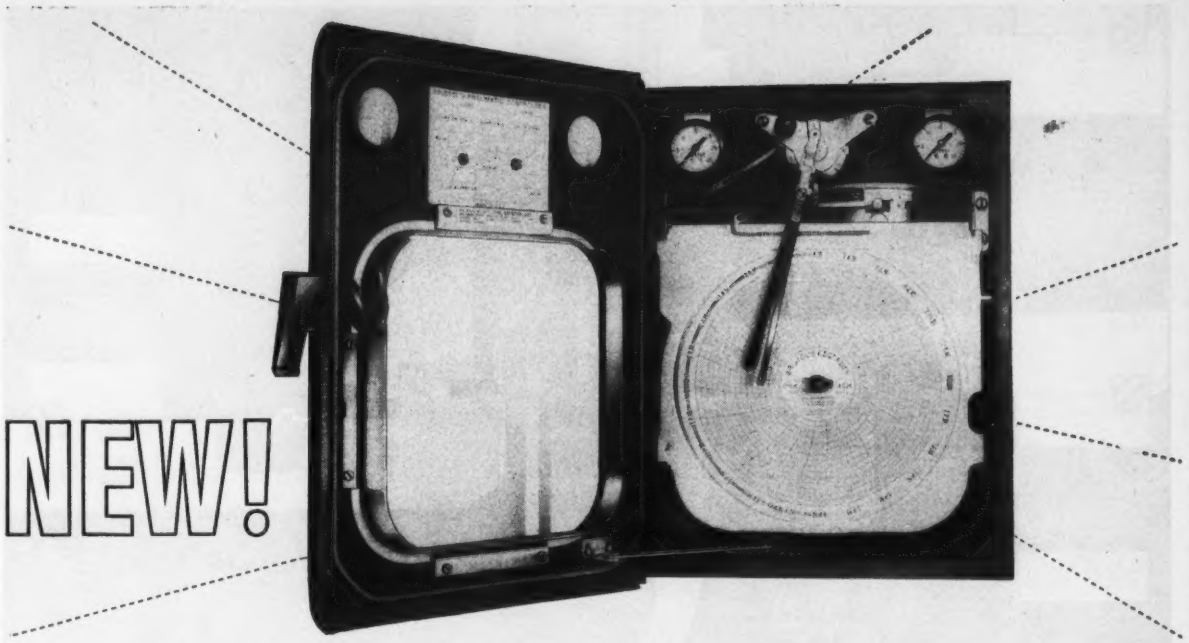
In this instance, two-place and three-place mountings are



basic units for building up multi-valve stations in unlimited series. Additional blocks can be added at any time after initial installation. Screw driver and allen wrench are only tools required for assembling and dismantling.

(Co-Ordinates multiple subplates are described in Bul 960—Versa Products, Co., Inc., Englewood, N.J.)

Check 3416 opposite last page.



Bristol Series 532 A/D* pneumatic recording controller is outstandingly SIMPLE, RELIABLE, and STABLE

- **Simple modular design for ease of servicing**
- **High control stability for closer process control**
- **Designed for batch-type and continuous processes**
- **Proportional, proportional-plus-reset, and proportional-plus-derivative control models available**

Top control performance with maximum simplicity plus standard Bristol precision measuring elements—those are the key features of the Bristol Series 532 Recording Controller. The 532 uses the same renowned elements that have earned such a reputation for accuracy and dependability on other Bristol automatic controlling and recording instruments—perfected through wide experience and many years of development.

Self-contained modular design of the control unit speeds servicing. The whole modular unit, consisting of an aluminum casting with working parts made of stainless steel, Ni-Span C, and Neoprene diaphragms, can be removed by taking out only two screws and a link.

The die-cast aluminum instrument case (15¾ x 10¾ x 5¾ overall) presents a streamlined appearance and is completely dustproof and weatherproof.

Write for complete data on the new, versatile, economical 532 A/D. The Bristol Company, 141 Bristol Road, Waterbury 20, Conn., a Subsidiary of American Chain & Cable Company, Inc. 0.46

ACCO

CONTROL UNIT CHARACTERISTICS:

PROPORTIONAL BAND: 0-400% continuously adjustable, direct- or reverse-acting.
RESET: 0.1 to 100 repeats per minute.
DERIVATIVE: 0 to 10 minutes derivative time.
AIR PILOT: Non-bleed type.
PILOT CAPACITY: Over 3.0 scfm.
FREQUENCY RESPONSE: Essentially flat to 300 cycles per minute.
TEMPERATURE STABILITY: Less than 0.1% change in the output pressure for 90°F temperature change.
CHART: 8" diameter; wide variety available.
MATERIAL: Aluminum housing; 316 stainless steel internal parts; Ni-Span C feedback element.

RECORDING CONTROLLERS OFFERED FOR:

PRESSURE AND VACUUM: Ranges from full vacuum to 15,000 psi.
TEMPERATURE: Ranges from—100°F to +1000°F.
FLOW AND DIFFERENTIAL PRESSURE: With mercury-type manometer and dry-type differential unit.
LIQUID LEVEL: With bulb unit and mercury manometer and dry-type differential unit.
HUMIDITY: Zero to 100% relative humidity.

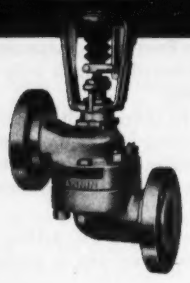
*Advanced Design

BRISTOL ...for improved production through measurement and control
AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

Check 3417 opposite last page.

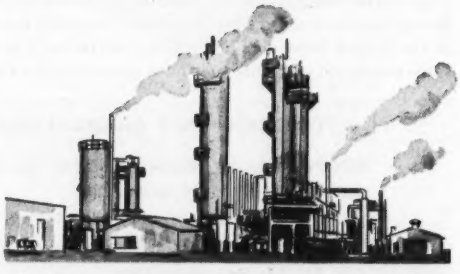
NEW FROM ANNIN—

The Control Valve that Drains Itself



ANNIN'S MODEL 1900 SELF-DRAINING CONTROL VALVE is designed to completely drain the line and valve body of corrosive fluids, slurries, and other flowing media which contaminate or tend to set up and harden in the system. Body and trim are designed so that all surfaces slope downstream, making the valve completely self-draining when installed in either the horizontal or vertical position. All body parts are interchangeable with other Annin models, allowing an option of globe, angle or three-way body patterns. Model 1900 is designed to accept all standard actuators—Pneumatic Domotor, Electro-Pneumatic, Electro-Hydraulic, Cylinder or Manual.

Send for latest technical information.



Model 1900 has many applications in the process industries, both in batch operations which require cleansing of the system after each run and in continuous processes after the system is shut down. Unique self-draining design of the valve body eliminates problems of fluid contamination, fermentation, toxicity and solidification.

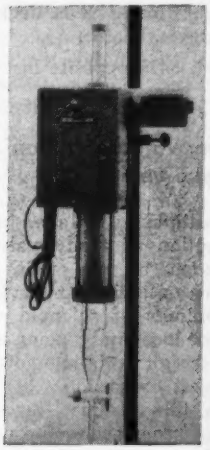
Annin **VALVES**

THE ANNIN COMPANY
1040 South Vail Avenue,
Montebello, California

Check 3418 opposite last page.

Titrant-reservoir capacity goes from 3.2 to 32 ml with buret attachment

A buret attachment increases titrant reservoir capacity from 3.2 to 32.0 ml. The attachment permits analysis to titrate volumes ranging from micro through macro quantities. Precision and accuracy of buret is such that concentrated titrants can be used to 1) complete a titration wherein volume of titrate remains constant, 2) maximize end-point effect irrespective of method used (colorimetric, potentiometric), or 3) perform as many as 35 titrations without refilling the buret.



This 32.0-ml-volume buret permits analysis to titrate volumes ranging from micro through macro quantities

(Buret attachment is product of American Instrument Co., Inc., 8030 Georgia Ave., Silver Spring, Md.)

Check 3419 opposite last page.

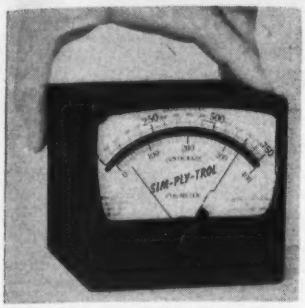
Automatic temp controls give almost flat temp curves

Uses: Automatic temperature control.

Features: Controls utilize form of proportioning action that minimizes over-shoot of set point and produces an almost flat temperature curve.

Description: Automatic temperature controls measure 4¼" wide x 4" high x 5⅛"

deep. They are capable of maintaining heat to within ±1°F. Units are intended for panel mounting with visual signal indication and are suit-



Automatic temperature controls are capable of maintaining heat to within ±1°F

able for built-in OEM applications. They take up only as much panel space as meter itself requires.

Temperature control periodically samples signal from heat sources usually at rate of six times per minute. Rate of interruption can be field-adjusted by moving lug to different connection on terminal strip.

(Temp-Tendor controls are product of Assembly Products, Inc., Chesterland, Ohio.)

Check 3420 opposite last page.

ARE YOU A CARTOONIST?

If so, you can recognize humorous incidents in chemical processing operations that can be turned into profits for you.

CHEMICAL PROCESSING will pay:

$10 for black ink cartoons (with gag lines) on 8½ x 11" sheets — ready to reproduce — payable on acceptance.

$5 for cartoon ideas — written descriptions or rough sketches of scenes — and captions.

Send your cartoon material to:

Cartoon Editor
CHEMICAL PROCESSING
111 East Delaware Place
Chicago 11, Illinois

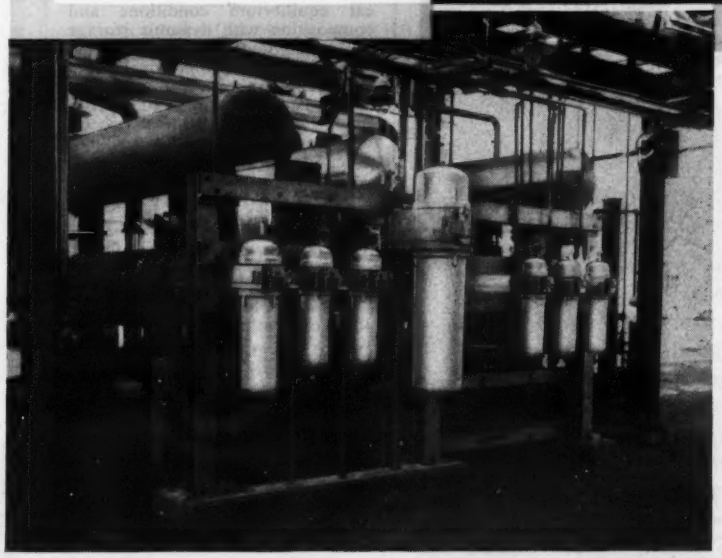
Don't forget to include your name, address, and company affiliation.

Another Reason for choosing Square D...

NEW RACKS FOR SPIN TOP® ENCLOSURES

FOR HAZARDOUS LOCATIONS

...you now can order Square D Spin Top enclosed starters completely wired and mounted on racks built to your specifications. Or, working through our field organization, we'll help you or your engineers design the rack. Either way, all the wiring and assembly work is done at the factory. Rack framework can be either bolted and hot-dipped galvanized or welded and painted.



INSTALLING your Spin Top rack on the job is a breeze. Just bring in the feeder connections to the bus bars, and make the outgoing power connections from starters to motors. It's as simple as that! Square D's exclusive "*slide* and hook" mounting arrangement greatly simplifies starter inspection and maintenance.

Spin Top enclosures are available in four sizes to include circuit breakers, across-the-line starters and combination starters, Size 0 through 5, reversing, non-reversing, and two-speed versions. They're built for Class I, Group C and D; and Class II, Group E, F, and G service.

Write for details. Square D Company, 4041 North Richards Street, Milwaukee 12, Wisconsin

SQUARE D COMPANY

wherever electricity is distributed and controlled

Check 3421 opposite last page.

The only complete line... NIAGARA STAINLESS STEEL METERS
METERS in capacities as low as 1 GPM to a high of 160 GPM. Model DV (right) size 1"- 1¼"- 1½". Model BNV (left) size ¾". Other sizes up to 2"
Now in a Sparkling "LUSTRE" Finish... INSIDE AND OUT... EASIEST TO CLEAN
The most complete line . . . the widest capacity range . . . the smoothest finish — you get them all in the new Niagara Stainless Steel Meters. Special "lustre" finish manufacturing process provides surfaces clean and smooth — inside and out. Minimizes pitting, corrosion, and product contamination. These new Niagara Meters are the easiest to clean inside and out. Combine these added features with Niagara's time-tested accuracy and dependability and you have a combination of qualities not found elsewhere. Remember too, only Niagara Stainless Steel Meters offers a wide selection of internal components to meet your process needs. Industries throughout the nation rely on Niagara Meters to measure and control fluid flow — increase production — cut costs. For complete information write for your copy of Bulletin 46.

Subsidiary of American Meter Co., Inc.

BUFFALO METER COMPANY, INC.

2917 Main Street, Dept. CP • Buffalo 14, N. Y.

SALES REPRESENTATIVES THROUGHOUT THE NATION

Check 3422 opposite last page.

NEW LITERATURE

Process Instrumentation and Laboratory Apparatus

Paper-chromatography equipment is considered in 18-page catalog describing line manufactured by Shandon Scientific Company, Ltd., of London, England. Included in products described are a 20″ two-dimensional chromatography tank, a multi-sheet chromatography tank which permits up to 50 one-way or 5 two-way chromatograms to be run simultaneously. Shandon Cat—Consolidated Laboratories, Inc.

Check 3423 opposite last page.

Temperature-regulating devices are available separately for incorporation in do-it-yourself installations or jointly as described in many typical applications. The line is presented in Cat 360—American Instrument Co., Inc.

Check 3424 opposite last page.

Metering system comprised of magnetic flowmeter (either standard or miniature type) and indicator-recorder which measures fluids with conductivities as low as 0.1 micromhos/cm, is described in eight-page Specification 10D1410B —Fischer & Porter Co.

Check 3425 opposite last page.

Determination of complex chemical equilibrium conditions and composition with dynamic storage analog computer is subject of 9-page report. Equilibrium evaluations help optimize such variables as feed temperature and operating pressures in chemical process development. Form 80-105-008—Computer Systems, Inc.

Check 3426 opposite last page.

Transducer's applications, operating principles and design considerations are reviewed in Regohm Transducer Bul—Electric Regulator Corporation.

Check 3427 opposite last page.

Laboratory furniture is subject of a recent market-research study, the results of which have been made available in chart form. Laboratory Furniture Report—Laboratory Equipment (Furniture) Section, Scientific Apparatus Makers Association.

Check 3428 opposite last page.

Position transmitter is specified in single-sheet publication including characteristic curves of percent travel versus percent signal, including square-root relation, linear relation and square relation . . . showing ranges over which cams can be shaped. Product Specification P99-10—Bailey Meter Company.

Check 3429 opposite last page.

Process equipment problems?
Produces chemical lime with 20% less fuel
Taming Phosphoric Acid Evaporations
Smash TiO2 down to ¼ micron on tonnage basis
Commercial zone refining makes silicon ultrapure
See the process equipment editorial department

Automatic system of semi-quantitative analysis for electrophoresis and chromatography is considered in Bul WI-6510 — LKB Instruments, Inc.

Check 3430 opposite last page.

Clamps, supports and holders for industrial, clinical and testing laboratories are completely illustrated and described in 16-page catalog. Bul FS-228 — Fisher Scientific Company.

Check 3431 opposite last page.

Method of inspecting products such as pills, tablets and capsules for proper filling is provided by inspection instrument which separates products containing tracer of magnetic material through application of concentrated magnetic field. It is specified in Accept-Tron A-1000 Bul—Instrument Apparatus Div., U. S. Testing Co., Inc.

Check 3432 opposite last page.

Spring and diaphragm actuators are covered in four-page bulletin including detailed drawings of various types. Bul B-1020-7—Conoflow Corporation.

Check 3433 opposite last page.

X-ray analytical methods for use in lubricating oils, crudes, distillates, residuals, additives and cracking catalysts is subject of four-page X-ray Spectrographs Bul —Philips Electronic Instruments, division of Philips Electronics and Pharmaceutical Industries Corp.

Check 3434 opposite last page.

Combustion bombs and calorimeters and pressure-reaction apparatus are subject of a duo of data sheets. Both are presented as 16-page illustrated price lists covering complete units, component parts and accessories. Price Lists 61-1 (bombs) and 61-2 (reactors) — Parr Instrument Company.

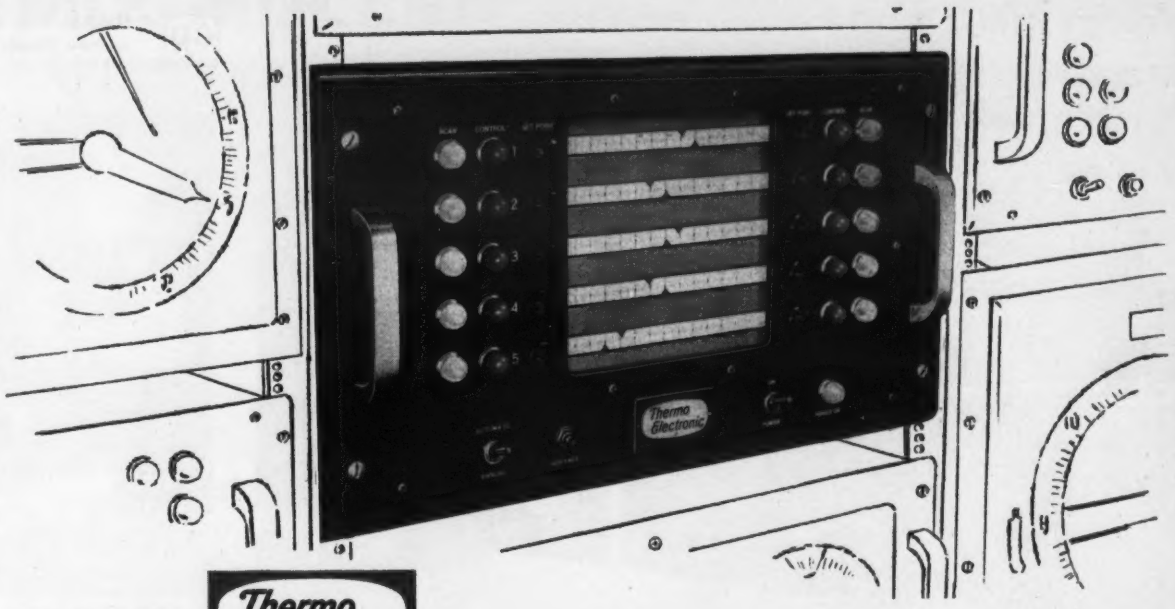
Check 3435 opposite last page.

Electric-hydrometer applications are described in 16-page bulletin. Included are those requiring direct measurement of liquid density either to directly indicate density (or specific gravity), or to provide gravimetric correction for liquid flow or tank-contents-indicating systems. Bul 522A—The Liquidometer Corporation.

Check 3436 opposite last page.

Air-comparison pycnometer's advantages in conducting barite-ore density measurements are explained in Application Data Sheet P-8071—Scientific and Process Instruments Division, Beckman Instruments Inc.

Check 3437 opposite last page.



ONE Thermo Electronic Multi-Point Controller

Controls TEN Process Temperatures

One, compact "Thermo Electronic" Multi-Point Controller gives you, sensitive, accurate, automatic . . .

- Two position (off-on) control of up to ten separate process temperatures; also controls flow, pressure, pH, Strain gages, and other operations.
- Three position control of five separate processes!
- Single point constant control of any critical process!
- Manual-Balance Indication of exact process conditions!
- Monitoring of extra points or those already under control!

Ten in One

One instrument does the job of ten individual controllers. You save—40 to 60% of initial cost—up to 75% of panel space —cut installation time and cost—minimize maintenance!

Clean, Simple, Functional Design

The "Thermo Electronic" Multi-Point Controller has front-set controls for easy operation. Routine maintenance is also done from the front, without removing unit from panel or relay rack. Available in either potentiometer or bridge measuring circuits, with an extremely stable constant voltage supply, the instrument provides long-lived, trouble-free control of practically every process suitable to off-on control action. Sensitivity is 15 microvolts independent of scale span—Accuracy is ±0.5% of scale span.

Operation

Sensing element input signals are compared, in sequence, to individually adjustable slide-wire set-points. Signal deviations are amplified by the "Thermo Electronic" high-gain relay control amplifier, and used to actuate load relays connected to the points being controlled.

Scanning sequence is governed by a stepping switch and electronic timer. Scanning rate—3 seconds per point. Other scanning speeds are available by simply changing one carbon resistor.

Ten white lights on the instrument panel show scanning position—ten red lights show process condition. Ten knobs permit adjustment of individual set-points on the range scales. Ranges are available for thermocouples, resistance temperature detectors and other types of suitable transducers.

Maintenance Is Easy

The instrument slides forward on built-in tracks. Simple adjustment and inspection is easily accomplished from the front. The plug-in or screw-terminal components are easily replaced—fully protected from dirt and corrosive atmosphere. The whole instrument is gasketed to further protect components.

Safety Engineering

Critical circuitry is fused against overloading. A failsafe circuit is provided to protect processes against thermocouple burn-out and amplifier component failure.

Write today for Instrument Section 52-5

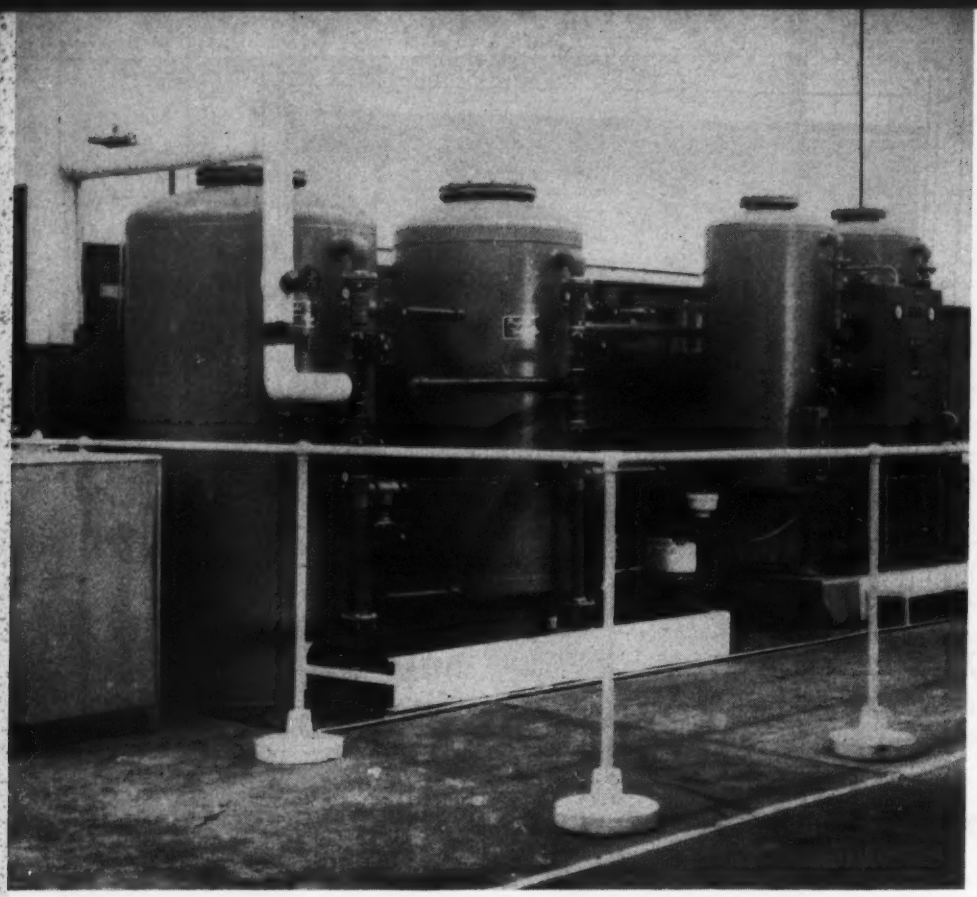
Thermo Electric

Temperature Measuring Systems and Components

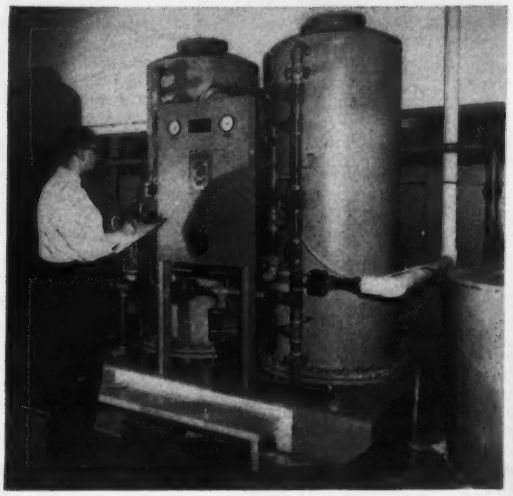
20 YEARS

THERMO ELECTRIC Co., Inc., Saddle Brook, New Jersey
In Canada: THERMO ELECTRIC (Canada) LTD., Brampton, Ont.

Check 3438 opposite last page.



IDEAS: from other industries and nuclear field — new trends in research, processes, services



Operator checks instrument panel on demineralizer for influent pressure, temperature and effluent purity. Unit is equipped to regenerate automatically when purity drops to cutoff level, but Sylvania checks purity every two hours and schedules regeneration for off-shift hours

Water containing over 88ppm minerals is purified to between 1- and 1½-ppm level at up to 3000-gph-rate by system comprised of (left to right) anthracite filter, activated-carbon filter and dual-column deionizer

With five weeks warning that water supply would be infused with well water, amply pure for drinking but catastrophically impure for fluorescent-tube manufacture, Sylvania officials faced crisis—but all ends well as . .

Packaged purification averts plant shutdown

ASSIGNMENT: Analyze your company's water purification needs; investigate available systems; select the best one; install it. And . . . have it in operation in five weeks or face an emergency shutdown.

A NEW SOLUTIONS FEATURE

If you think this is an ulcer-activating situation, consider the plight of operating management for Sylvania Electric Company's Fluorescent Tubes Division last spring when its water supplier, the town of Danvers, Mass., announced that well water would be cut into its mains, previously supplied from reservoir only.

The well water contained up to 88 ppm metallic salts and other minerals—pure enough for human consumption, but disastrously impure for the hypersensitive requirements of fluorescent tube production.

When the news first broke, Sylvania's officials didn't even have the five-week grace period. An emergency meeting in mid-June with cooperative Danvers officials brought that dispensation. Most important, the extension was timed to take advantage of the annual two-week recess for employee vacations in July.

First step was to analyze water-purification needs. This showed that the company needed two separate water-purification systems—one for Plant 1 which required 12,000 gpd of tube-wash water, and the other for Plant 2 where 20,000 gpd was needed. In addition, the systems had to be expandable to handle anticipated production increases.

These facts determined, Milton Davis, plant engineer, prepared specifications and solicited bids.

Price, as usual, was a factor, but Davis recalls: "We would have paid almost any price if we could have been certain of delivery."

Among the bids received was one from a manufacturer of "packaged" units, which not only was competitive pricewise, but also promised swift delivery. Davis rushed into the field to check similar installations; then confirmed the order the last week in June. The confirmation stipulated that the units be in Danvers on July 18, the day the plant was to be shut down for vacations.

Delivered on schedule were anthracite and activated-carbon pre-filters, and a dual-column demineralizer. Installation was completed nine days later, in time for cutting in coincidental with the addition of well water to Danvers' water supply and resumption of manufacturing.

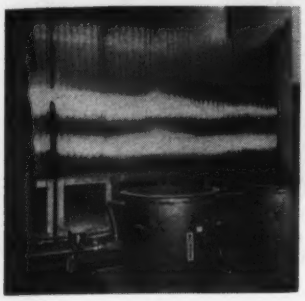
In each installation, town water is passed first through an anthracite filter where turbidity is reduced to the point where activated-carbon filters can elimi-

nate color traces and remove remaining organic materials.

Dual-filtered water is then fed to the dual-column demineralizer—a 1500-gph-capacity unit in Plant 1 and a 3000-gph-capacity model in Plant 2.

Filters, demineralizers and neutralizing tanks are linked by polyvinyl choride pipe while copper tubing carries deionized effluent to washers.

Contaminants in the water are entrapped by ion exchange



Emerging from high-purity wash, assured by purification system, tubes (background) undergo drying before being coated

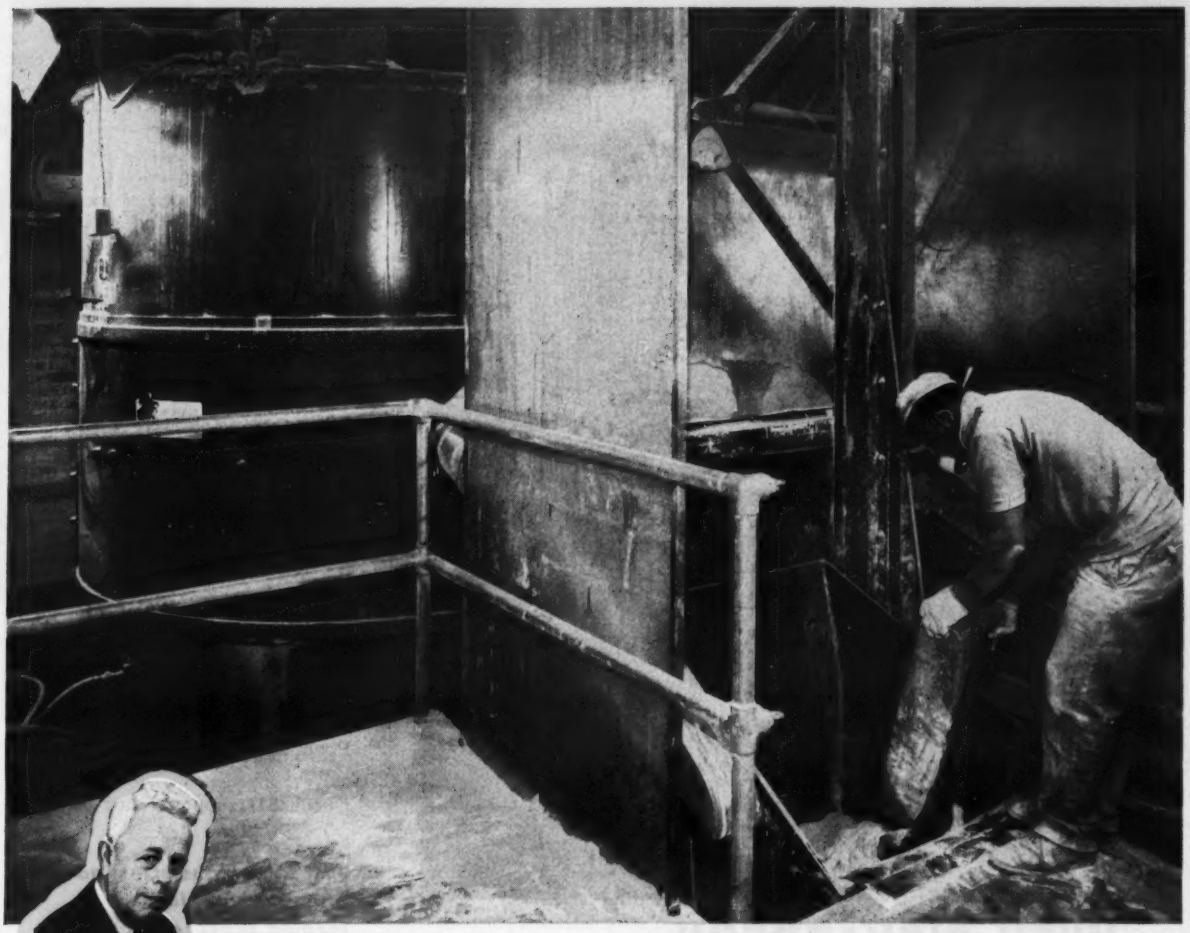
action in the resin-filled columns of the demineralizers. These require periodic regeneration—stripping of impurities—but have been operated up to 10 shifts without regeneration.

The system is designed to cut out automatically at a predetemined purity point which is dial-set by the operator. Should effluent exceed this level, the demineralizer shuts down and a warning signal alerts the operator.

Regeneration is accomplished automatically, started by the turning of a switch. Regenerants (acids and caustics) are drawn through the resin beds until conductivity of the effluent exceeds the pre-set limit. Then the demineralizer is returned to service.

The instrument panel provides a direct reading of purity of effluent at all times, although readings are only taken every two hours. Regeneration is normally scheduled for off-shift periods (Sylvania operates two shifts daily). The panel also includes meters showing air pressure,

MIX-MULLER® means Controlled Dispersion



"This Mix-Muller helps us produce better tile in less time."

. . . John C. Elder, Factory Manager, Robertson Manufacturing Company, Morrisville, Pennsylvania

In October 1960, the Robertson Manufacturing Company, a large eastern tile manufacturer, replaced their continuous filter system with a dry mix system using a Model 3F Simpson Mix-Muller. In December, Mr. John Elder, Factory Manager, had these comments to make about the new installation:

"Incomparably" better moisture control

"The Mix-Muller system allows us to maintain moisture variation to within plus or minus .1%. This allows a better, cleaner die fill which has increased our press efficiency and has reduced pressing and firing rejects. Better moisture control has also permitted us to utilize the faster and more economical 'one-fire' method of operation."

Better utilization of manpower

"The old system operated seven days a week on a 3-shift basis. With the Mix-Muller, we are able to obtain the same production on a normal five day a week, 1½-shift work schedule . . . releasing manpower for other jobs."

Realize substantial space savings

"The Mix-Muller system occupies only ½ as much production space as the previous wet system. This releases floor space—which we intend to use for pneumatic handling equipment to charge the mixer."

In Summary . . .

"The installation will pay for itself in reduced processing costs and increased production—notwithstanding the obvious benefits of vastly superior quality control."

If *you* mix dry or wetted solids, can you *afford* not to investigate how employment of *controlled dispersion* in a Simpson Mix-Muller can help you to attain (and we quote) *"vastly superior quality control . . . increased productive capacity . . . at less labor cost."*

See your National agent or write for the *Handbook on Mulling.*

P-261

SIMPSON MIX-MULLER® DIVISION
National Engineering Company
640 Machinery Hall Bldg. • Chicago, Illinois

Check 3439 opposite last page.

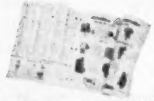
HOW CONGOLEUM-NAIRN GETS PRECISION COLOR CONTROL IN VINYL TILES...

WITH RICHARDSON SELECT-O-WEIGH

Have you ever proudly stood back to gaze on the tile floor you just laid and then, like a blow between the eyes, you see that some of the tiles are off shade. Precision blending could have prevented this, the kind Congoleum Nairn gets from their Richardson Select-O-Weigh Batching System, where pigments and fillers are fed and precision weighed right from bin to Banbury. The system doesn't forget ingredients, doesn't mis-count or get tired. Formulas can be changed quickly, too, simply by re-setting the weight selector dials.

Richardson know-how in all kinds of process automatic weighing comes from thousands of installations all over the world. Richardson means reliability . . . the ability to stand the gaff of day in, day out plant operation. Why not apply this know-how to your batching problem? **Write or phone Richardson Scale Company, Clifton, N. J.**

Send for free technical bulletin



RS-13

Richardson

Sales and service Branches in Principal Cities. Also manufactured in England, France and Australia. Richardson Scales conform to U. S. Weights and Measures H-44 for your protection.

MATERIALS HANDLING BY WEIGHT SINCE 1902

Check 3440 opposite last page.

influent and effluent pressure.

Use of calcium chloride neutralizers render harmless the caustics and acids in the regeneration cycle before they are drained into the sewage system.

Demineralized water, containing as little as 1 to 1½ ppm minerals (much purer then required), is fed to fluorescent-tube wash lines at 20-gpm-rate in Plant 2 and 15-gpm-rate in Plant 1. Rates are predetermined by production needs.

After heating, water is pressure-sprayed on the glass tubes which pass through an enclosed conveyor line enroute to drying and coating. Heated wash water is recirculated through baffled settling tanks, an integral part of the automatic washers.

(Anthracite and activated-carbon pre-filters, and Model ULA-1000 and Model ULA-3000 Dual-column Demineralizers are manufactured by Penfield Mfg. Co., Meriden, Conn.)

Check 3441 opposite last page.

Just six months after 'go ahead' given, largest forging press 'going'

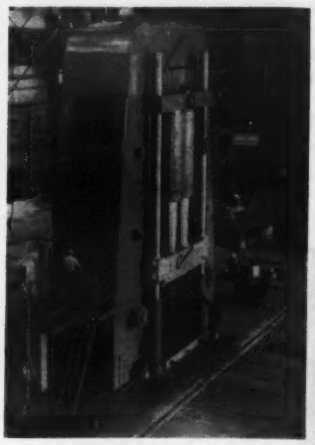
Just six months after the okay to build it was given, a 20,000-ton forging press was making possible the forging of products in larger sizes, lengths and shapes than previously possible and with greater quality control.

Designed and built by Cameron Iron Works, Inc., Houston, Texas, unit is world's largest privately-owned multiple-ram forging press equipped for forging steel, refractory metals, high density and other sophisticated alloys in closed dies.

In the Cameron method, the die is first closed and metal is displaced in the die to fill without flash. Long extrusions can be made vertically through the press.

As an example of the press' capacity, its first forging was a 6000-lb aircraft shaft, 12½' long, shaped like a funnel with large end approximately 3' in diam and shaft end 12" in diam. Shaft was forged from stainless steel.

Frame of the press measures 50' from top to bottom and 31' across bottom. It



Giant multiple-ram forging press seen from above with accumulator system visible in background

weighs more than 4 million lb. Bottom platen is 12' from front to back and from side to side. Daylight is 15', stroke, 90".

Side rams will exert 5000 tons force each (7500 tons each, under intensification). Piercing ram inside main ram has down-acting range of 4200 tons. Four pullback rams have gross of 940 tons. Net stripping force is 400 tons while bottom knock-out punch is 650 tons.

With adjustment, press can produce extrusion up to 30' long, 56" in diam, and weighing up to 30,000 lb.

Flow control permits press to be operated within range of 0 to 400'/min.

(20,000-ton forging press is development of Cameron Iron Works, Inc., Katy Road, Houston, Texas.)

Check 3442 opposite last page.

NEXT MONTH

Improved community relations and more effective air pollution controls are dividends accruing from using a monitoring system in connection with phosphate manufacture. For details, look for the story in this section next month.

▸ A NEW SOLUTIONS FEATURE

Polyethylene pipe in mine costs 5½% less; saves installation time

Use 21,000′ to carry water and air; fight fires

At Tralee, W. Va., bituminous coal mine of Allied Chemical, use of 2″ polyethylene pipe is cutting installation time at a material cost of 5½% less than for pipe previously used.

To date, 21,000′ of pipe has been installed for air and water lines in the mines. Flexibility and continuous lengths of pipe is of particular advantage to workmen when installing pipe in low height areas.

Majority of pipe is used in the Main South area of the mine where adverse roof conditions require roof bolting. In addition to being used for compressed air lines, pipe is being used for spray lines and drainage.

Since it can be installed quickly, pipe is finding use for emergency fire fighting, also.

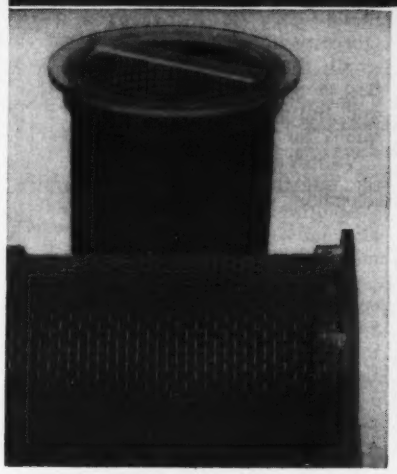
(Orangeburg SP 2″ pipe is fabricated by Orangeburg Manufacturing Company, Inc., 488 Madison Ave., New York 22, N.Y.)

Check 3443 opposite last page.

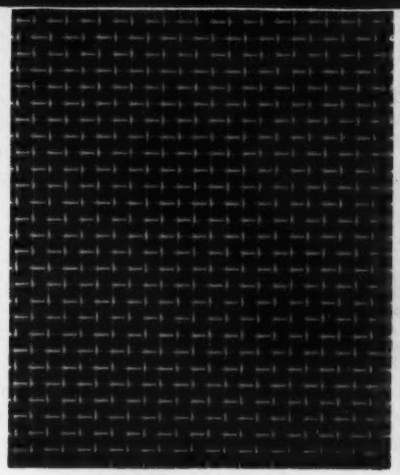
"Joey's dedicating his life to disaster prevention. He's working on 'anti-accidents'."

Henry Gains Goodman, Union Carbide Chemicals

Need Wire Cloth in Special Metals? call *Cambridge*



HASTELLOY C*



SILVER

TITANIUM

Working with unusual metals or alloys—as well as with standard metals and alloys—is almost an everyday occurrence at Cambridge. For instance, not too long ago, we developed the first practical method of weaving titanium into wire cloth—with mesh counts far higher than had been expected by the customer. Platinum, lead, stainless steel, or bronze—whatever the metal or alloy used, Cambridge has the experience and facilities to produce wire cloth in any size or quantities to the closest tolerances.

If you require fabrications—of any shape or size—Cambridge has the craftsmen and know-how to fill even the most rigid specifications. Or, we'll draw up prints for your approval. There's a wire cloth expert near you—ready to discuss your needs and show you how to get what you want economically and on time. He's your Cambridge Field Engineer... and his name is listed in the Yellow Pages under "Wire Cloth." Or, write for our illustrated, 120-page catalog.

Refer to our technical data sheets in CHEMICAL ENGINEERING CATALOG, Page 185

The Cambridge Wire Cloth Co.

DEPARTMENT F • CAMBRIDGE 4, MARYLAND

Manufacturers of Wire Cloth, Wire Cloth Fabrications, Metal-Mesh Conveyor Belts and Gripper® Metal-Mesh Slings.

*Reg. T.M. of Union Carbide Co.

Check 3444 opposite last page.

WHATEVER THE BREATHING HAZARD

Scott Sling-Pak Model 6000-B4A

When seconds count, reach for the Scott Sling-Pak. This model is the fastest piece of emergency equipment made. Ideal for fast, safe entrance into hazardous atmospheres. Cylinder holds enough pure breathing air for 15 minutes of hard work. Breathing protection at lowest cost.

Scott Air-Pak Model 6000-A2MS

For dangerous jobs of longer duration. Safe, comfortable breathing protection for a minimum of 30 minutes at extreme exertion. Bureau of Mines Approval No. 1308.

Scott Demand Respirators

Designed especially to provide breathing protection in atmospheres not immediately dangerous to life and from which the wearer can escape without breathing equipment. Cylinder models and plant air-supply models available. Bureau of Mines Approval No. 1924.

Scottoramic Mask

Provides picture-window vision in all directions for greater safety.

Missiles and Space Vehicles

Military and civilian installations throughout the world, handling exotic fuels and chemicals, are depending on Scott Protective Breathing Equipment to solve their respiratory problems.

SINCE 1932 Scott

SCOTT AVIATION CORPORATION

242 ERIE STREET • LANCASTER, N. Y.

Canada: Safety Supply Co., Toronto — Branches in Principal Cities
Export: Southern Oxygen Co., 3 West 57th Street, New York 19, N. Y.

Check 3445 opposite last page.

IDEAS

▶ A NEW SOLUTIONS FEATURE

Flow of powder from bin hiked threefold by use of porous panels

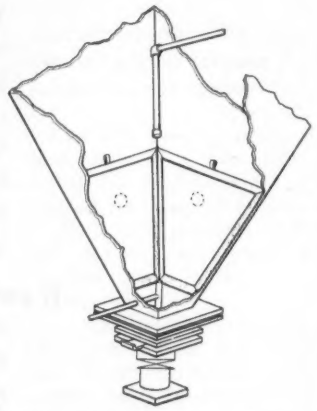
Problem: Poor flow of powder from bin to weigh feeder system was seriously hampering production for large synthetic fiber manufacturer. Quantity discharged was too small; the material bridged in bin, stopping flow completely; and shutdowns were too frequent for sustained operation.

Vibrators or shakers were not effective in this case.

Solution: After reviewing alternatives, the design group, materials handling group, and process group at the company decided that aerating or fluidizing the powder by means of inert gas (nitrogen) would be the most feasible approach.

Blowing nitrogen gas through porous panels would provide a gaseous coated frictionless bin wall. Additional gas could be blown into the packed powder by perforated probes.

A variety of materials, including porous stone and woven fabric, were tested but were ruled out because of nonuniformity, contamination.

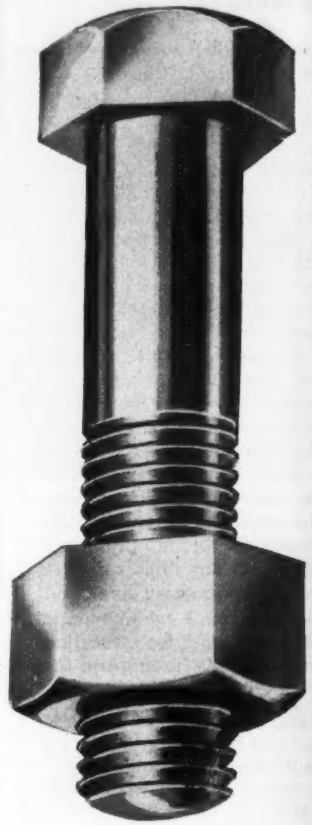


This arrangement of porous stainless steel panels and probes in bin solved flow problem

Investigation showed that large panels of uniform porosity sintered porous stainless steel possesed the right combination of properties needed for creating and dispersing multitude of fine gas bubbles. Properties of PSS promised to keep product contamination to

Uniform Class 3 Fit

BOLTS·NUTS·STUDS



- TITANIUM
- STAINLESS STEELS
- CARBON STEELS
- SILICON BRONZE
- ALLOY STEEL
- NAVAL BRASS
- MONEL METAL

You can depend on a uniform Class 3 fit if required when you buy Pawtucket threaded fasteners. Standard items or specialties — all Pawtucket products are accurately made in standard dimensions or to your specifications. Heat treating with precision-controlled modern equipment.

BETTER BOLTS SINCE 1882

PAWTUCKET

MANUFACTURING COMPANY

327 Pine St. • Pawtucket, R. I.

THE PLACE TO SOLVE YOUR BOLT PROBLEMS

"The Bolt Man" T.M. REG.

Check 3446 opposite last page.

zero while uniform porosity with controlled pressure drop could save considerable quantities of nitrogen.

Four porous stainless steel panels are used in the throat of each bin. Porous probes are placed farther up the bin wall and along the valley angles to prevent localized bridging.

Panels were "hung" on existing walls. The only cut made in walls was for gas supply. Panels and fluidizing systems were installed in 75 hr.

Results: Discharge capacity has been increased an estimated threefold. Ultimately rate is expected to attain several thousands lb/hr.

Although sintered porous stainless steel had been used in fluidized bed processes, and in other types of walls, such as aircraft de-icers, this is first use of porous stainless steel to promote flow from bins.

(Porous stainless steel panels and probes were provided by Micro Metallic Division, Pall Corp., Glen Cove, N.Y.)

Check 3447 opposite last page.

Firm provides capital for small business

Recently formed investment company, called Business Capital Corporation, will provide financing and equity capital for small business concerns. Capital up to $1 million can be provided to an individual business.

The company will have initial assets of $5 million and is the first one of its type in Chicago over the $300,000 minimum size. It has the backing of banks and other institutions in the city. In addition, 500,000 shares of stock at $10 per share will be issued for sale to the public.

Company will fill a need for those small businesses requiring capital who have not been able to obtain it in other ways at reasonable cost. It has the blessings of the Small Business Administration.

(Further information on financing can be obtained from Business Capital Corp., 728 W. Roosevelt Rd., Chicago 7, Ill.)

Check 3448 opposite last page.

SEL-REX RECTIFIER HELPS MAKE THE "LUBES" THAT KEEP MISSILES FROM BEING EATEN ALIVE!

At Hooker Chemical Corporation's Niagara Falls, N.Y. plant, a Sel-Rex rectifier supplies the current for an electrochemical operation important to the U.S. Space Program. It is production of fluorine, basic element of Hooker Fluorolubes®.

Polymers of trifluorovinyl chloride, Fluorolubes are made as non-flammable light oils, heavy bodied oils and greases. Their job is to protect missiles from their own corrosive chemical fuels—the metal-eating, highly-destructive action of pure oxygen, hydrogen peroxide and concentrated nitric acid.

According to Robert F. Schultz, production manager of Hooker's Eastern Chemical Division, the unit supplying current to the fluorine cells must provide uninterrupted, trouble-free service. To date, his Sel-Rex silicon rectifier "has met all expectations; it has proven completely reliable, presenting no maintenance problems and requiring little or no attention."

And for *your* special current needs—for reliable, continuous conversion of A.C. to D.C.—choose Sel-Rex, the industry-proved rectifiers that more than pay for themselves in unequalled dependability and maintenance-free service.

Send for Free "GUIDE" to Industrial Rectifier Equipment

A slippery blanket of Hooker-made Fluorolubes protects missile parts, serves as a lubricant, sealant. A Sel-Rex silicon rectifier supplies the current required to make fluorine, an essential ingredient. "Our Sel-Rex rectifier," states a company official, "has given us the high standard of dependable performance required for our operation."

Complete Semi-Conductor Power Conversion Equipment and Systems for any AC to DC Application

MEAKER 1899

THE MEAKER COMPANY

SUBSIDIARY OF SEL-REX CORPORATION

Nutley 10, New Jersey

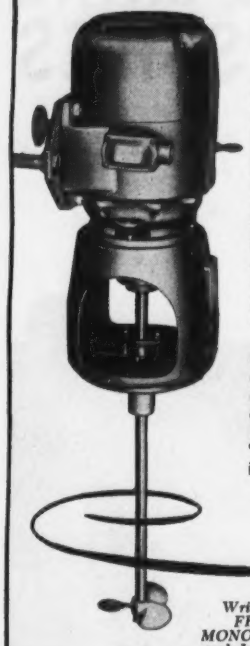
Factories and offices Chicago 50, Ill., Los Angeles, Cal. and Nutley 10, N. J.

Representatives in principal cities.

Check 3449 opposite last page.

MIXING PROPELLERS

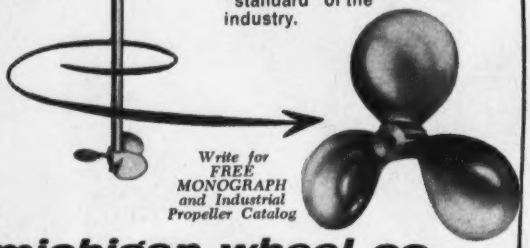
3" thru 72" Diameters



michigan

INDUSTRIAL PROPELLERS, like all Michigan propellers, are manufactured by the exclusive Machined-Pitch Process. The guaranteed absolute accuracy of these propellers makes them a "must" for agitating, mixing or pumping, especially when long shaft mounts are necessary. The incomparably accurate balance and blade indexing eliminate vibration and shaft "whip" to greatly prolong the life of your apparatus.

Stainless Steel, Bronze, Aluminum, or almost any alloy you desire is available in a wide variety of propeller types. The superior quality of Michigan Industrial Propellers makes them the "standard" of the industry.



Write for FREE MONOGRAPH and Industrial Propeller Catalog

michigan wheel co.

GRAND RAPIDS 2, MICHIGAN, U.S.A. 1-6R

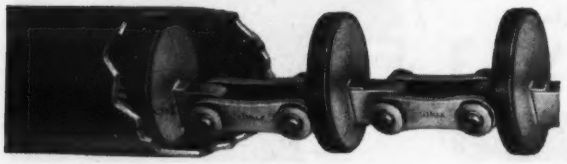
Check 3450 opposite last page.

Hapman Conveyors

offer you these outstanding features for your flowable material:

• Completely flexible • Compact • Self-cleaning
• Self-supporting • Self-feeding • Dust, odor-tight

almost always



cost more

. . . but return their cost many times. Sound engineering, superior materials and workmanship go into every Hapman installation. With Hapman tubular conveyors you have minimum wear, minimum degradation, and maximum trouble-free performance. This is why you may pay more initially but with Hapman you can be sure of the best conveying system . . . and save in the long run.

For Fact-Finding Report on Hapman Conveyors, write today to:

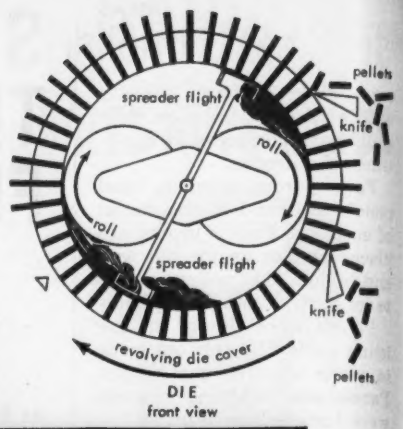
Dept. CP-4

Conveyor Division

HAPMAN
CORPORATION

630 Gibson St. • Kalamazoo 6, Mich.

Check 3451 opposite last page.



Principal equipment in low-cost process for producing pellets from polyethylene film scrap are rotary cutter (right in photo) and pellet mill (to the left and behind cutter). Diagram shows operation of mill.

Scrap pelleting process offers savings up to 20%

Bulkier, more dense polyethylene agglomerate produced with low-cost equipment

MOLDERS and extruders of polyethylene film can save up to 20% of the cost of rough materials as a result of development of a low-cost method for pelleting reprocessed film.

In the past, the industry has used a chemically reprocessed fused-type pellet. The high cost of equipment and the critical processing conditions required for this method made the cost of this type of pellet relatively high.

The lower-cost reprocessed pellets are made possible by a comparatively inexpensive, integrated compact system consisting of a cutter, two product collectors, a pellet mill, separator-classifier and two-way bagger connected pneumatically.

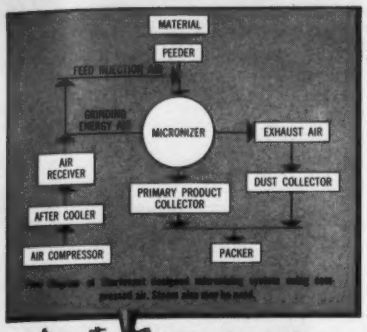
First to place the system into full-scale production and to market the agglomerates is the Interplastics Corporation of New York City.

This is how the system works: Polyethylene film scrap is fed into a cast-steel, rotary knife cuter having a 20-hp, 900-rpm direct-connected motor. The cutter has an adapter with a wide-throat hopper for convenient hand feeding.

If films from different resins are segregated, the need for specific operator attention and adjustment of machinery will be minimized. Otherwise, feed conditions will vary, requiring adjustments.

Need ½ to 44 Microns?

Sturtevant Micronizers* Make 325 Mesh Obsolete



One Operation Reduces, Classifies

Sturtevant Micronizers grind and classify in one operation in a single chamber—provide fines in range from ½ to 44 microns to meet today's increased product fineness needs. Can handle heat-sensitive materials.

Production Model (15 in. chamber)

No Attritional Heat

Particles in high speed rotation, propelled by compressed air entering shallow chamber at angles to periphery, grind each other by violent impact. Design gives instant accessibility, easy cleaning. No moving parts.

Classifying is Simultaneous

Centrifugal force keeps oversize material in grinding zone, cyclone action in central section of chamber classifies and collects fines for bagging. Rate of feed and pressure control particle size.

Eight Models Available

Grinding chambers range from 2 in. diameter laboratory size (½ to 1 lb. per hr. capacity) to large 36 in. diameter production size (500 to 4000 lbs. per hr. capacity). For full description, request Bulletin No. 091.

Engineered for Special Needs

A 30 in. Sturtevant Micronizer is reducing titanium dioxide to under 1 micron at feed rate of 2250 lbs. per hr. For another firm, a 24 in. model grinds 50% DDT to 3.5 average microns at a solid feed rate of 1200-1400 lbs. per hr. A pharmaceutical house uses an 8 in. model to produce procaine-penicillin fines in the 5 to 20 micron range. Iron oxide pigment is being reduced by a 30 in. Micronizer to 2 to 3 average microns.

Sturtevant will help you plan a Fluid-Jet system for your ultra-fine grinding and classifying requirements. Write today.

Can Test or Contract Micronizing Help You?

Test micronizing of your own material, or production micronizing on contract basis, are part of Sturtevant service. See for yourself the improvement ultra-fine grinding can contribute to your product. Write for full details. STURTEVANT MILL CO., 115 Clayton St., Boston, Mass.

*REGISTERED TRADEMARK OF STURTEVANT MILL CO.

Check 3452 opposite last page.

The scrap is cut and shredded to a size suitable for handling in the pellet mill.

Shredded material is picked up pneumatically by a 36"-diam products collector and passed through a special hopper with a variable-speed drive, permitting feed rates from 400-600 lb/hr, depending on film characteristics.

The screw conveyor feeds the scrap uniformly into the pellet mill, which is V-belt-driven direct from a 50-hp, 1200-rpm motor.

Basically, the mill consists of a precision-machined steel die into which thousands of small-diameter holes have been drilled. Feedstock, entering the die chamber, is squeezed through the holes by a set of rough-surfaced, friction-driven steel rolls, so positioned that they almost touch the inside diameter of the vertically rotating die.

Adjustable knives cut off the emerging "ropes" of polyethylene at controlled lengths. From the pellet mill, the pellets are conducted to a separator-classifier which recycles unacceptable material to a 44" products collector and from there back to the mill. Acceptable pellets go to bagger.

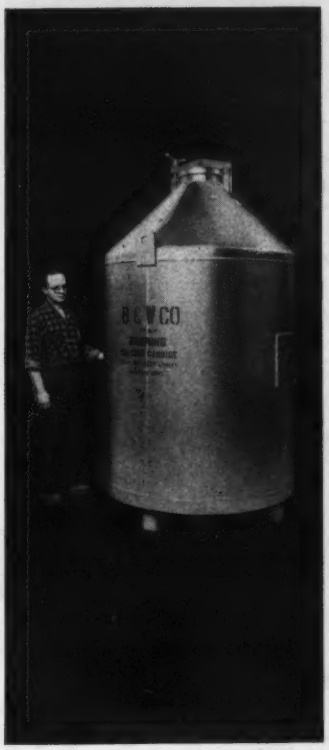
The pellet produced by this process is bulkier and more dense than the pellet made by conventional extrusion processes. The compressed film is held together by partial fusion which occurs as it is worked by the pellet mill.

Extent of fusion is controlled by increasing or decreasing the rate of feed to the die and by careful selection of the the right die thickness. These factors determine the retention time of the feed in the die, which in turn governs the amount of fusion.

The pellets can be used by extruders or compounders, injection molders or blow molders. Extrusion machines must be screw fed, however, since rough pellets do not pack tightly enough in the hopper.

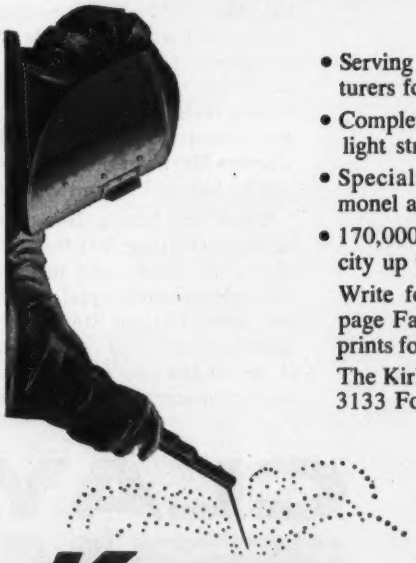
(System for pelleting reprocessed polyethylene film is a development of Sprout, Waldron & Co., Inc., Muncy, Pa.)

Check 3453 opposite last page.



Sheet Metal and Alloy Components, Weldments and Plate Work, Custom Fabricated

Tanks *any type, any size*



- Serving the nation's leading manufacturers for over 50 years
- Complete facilities in sheet, plate and light structurals
- Specialists in stainless, aluminum, monel and other alloys
- 170,000 sq. ft. plant with crane capacity up to 25 tons

Write for your copy of the K&B 40-page Fabrication Catalog or send your prints for prompt quotation.

The Kirk & Blum Manufacturing Co.
3133 Forrer St., Cincinnati 9, Ohio

Custom Fabricated by

KIRK & BLUM

Check 3454 opposite last page.

After three years of thorough research and testing...

RUST-PROOF ONE-PIECE FORGING
Enables downstream line to be removed with valve under pressure without adding extra parts.

LARGEST PORT OPENING
Largest port opening of any ball valve assures virtually no pressure drop through valve. Hard chrome-plated ball — no metal-to-metal contact assures longer life.

CLAYTON MARK
ANNOUNCES THE NEW
Petro® Ball Valve

From a famous family of unions and fittings comes the Petro Ball Valve—a new departure in smooth, effortless, positive sealing that combines basic improvements with unique new developments that only years of research and testing by Clayton Mark engineers could achieve. A new departure, because Clayton Mark literally started where the others left off. *For example*—Clayton Mark Engineers found that nuts and bolts were, and still are, needed to install and repair ball valves. They eliminated this necessity with the union-end assembly feature to provide faster, easier installation and maintenance. *For example*—they also found that a way to reduce pressure drop is needed. Clayton Mark engineers incorporated the largest port opening of any ball valve to assure virtually no pressure drop.

These are just a few of the advances resulting from extensive testing that started with the premise that all ball valves are good—and proceeded from there to develop a ball valve without equal. The new Petro Ball Valve in Stainless Steel, Carbon Steel, and Brass is the result. And remember—*each and every Petro Ball Valve is air tested as it leaves the production line to assure perfect operation.* Write for complete information.

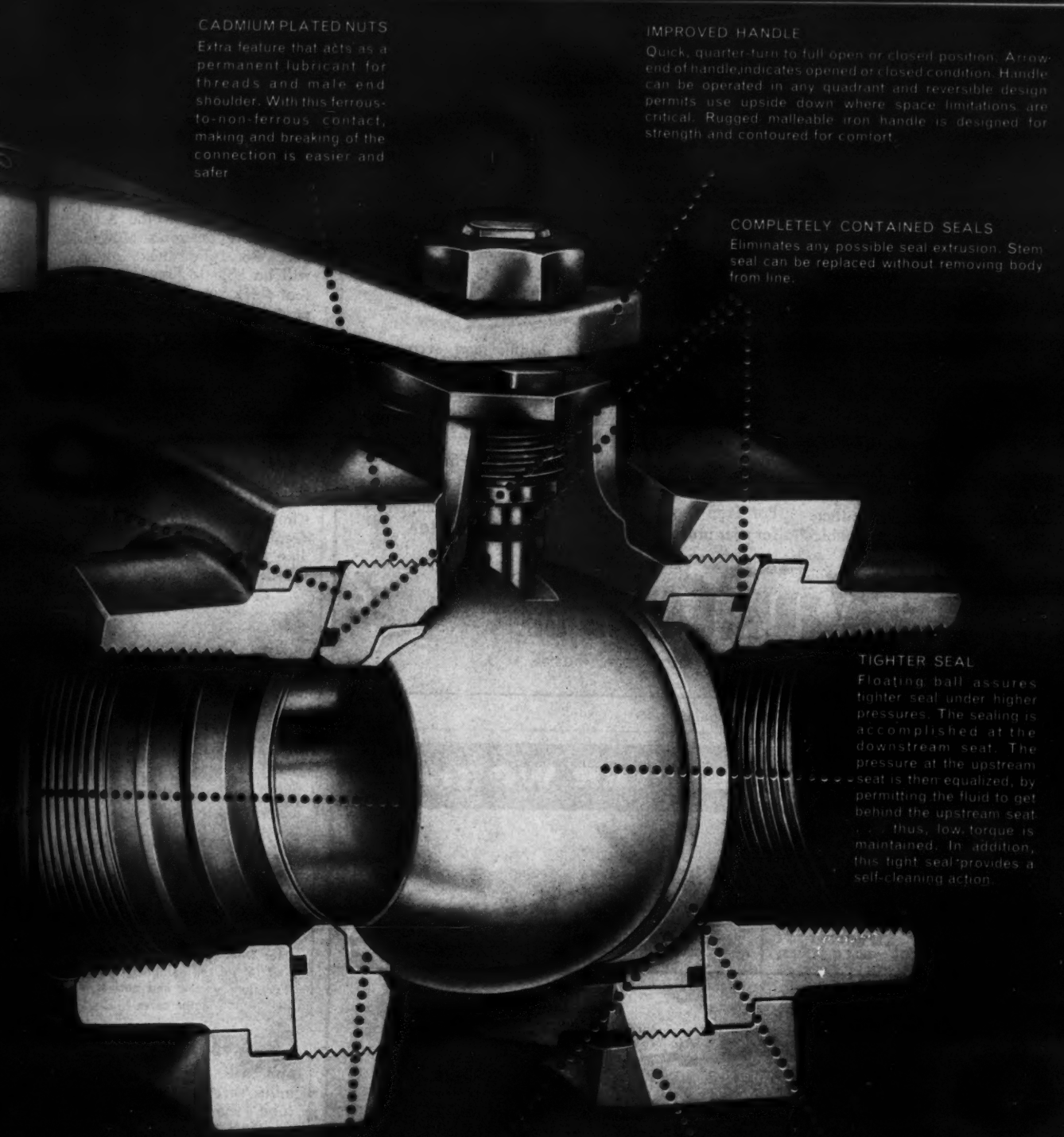
CLAYTON MARK
& COMPANY
1900 Dempster Street • Evanston, Illinois

PUMPS · WATER WELL SUPPLIES · CONDUIT · UNIONS · TUBING

The Clayton Mark Petro Ball Valve has been tested over 250,000 times under MAXIMUM PRESSURE CONDITIONS without failure.

For more information on product at right, specify 3455 see information request blank opposite last page.

1595



CADMIUM PLATED NUTS

Extra feature that acts as a permanent lubricant for threads and male end shoulder. With this ferrous-to-non-ferrous contact, making and breaking of the connection is easier and safer.

IMPROVED HANDLE

Quick, quarter-turn to full open or closed position. Arrow-end of handle indicates opened or closed condition. Handle can be operated in any quadrant and reversible design permits use upside down where space limitations are critical. Rugged malleable iron handle is designed for strength and contoured for comfort.

COMPLETELY CONTAINED SEALS

Eliminates any possible seal extrusion. Stem seal can be replaced without removing body from line.

TIGHTER SEAL

Floating ball assures tighter seal under higher pressures. The sealing is accomplished at the downstream seat. The pressure at the upstream seat is then equalized, by permitting the fluid to get behind the upstream seat . . . thus, low torque is maintained. In addition, this tight seal provides a self-cleaning action.

INTERCHANGEABLE SEATS

Are available in a variety of materials to meet most media problems.

UNIQUE UNION-END INSTALLATION

Union ends eliminate use of nuts and bolts for faster easier installation and disassembly for maintenance. Also permits maximum pipe misalignment without effecting sealing characteristics, permits valve body rotation under pressure, and allows for complete removal of valve body without disturbing piping installation . . . thereby eliminates any need for additional union.

DUAL SEATS

Permit sealing regardless of direction of flow, and provide check valve feature where back flow is a problem.

WHY IS THIS A BETTER PUMP?

Because . . .

Vanton Sealless Plastic Pumps do not have troublesome shaft seals and stuffing boxes. They do not leak, do not contaminate pumped medias and have a longer service life than most standard chemical pumps.

What's more Vanton corrosion resistant Sealless Plastic Pumps are self-priming and handle fluids, gases and slurries with equal ease. They're easy to install and easy to maintain.

Vanton's unique non-agitating pumping action prevents breakdown of sensitive fluids. Because there are no check valves or gaskets required, troublesome maintenance problems associated with these parts are eliminated.

There is a Vanton Pump to handle most every chemical, corrosive fluid, abrasive fluid and their combinations within the temperature and pressure limitations of the pump.

Vanton pumps are available in capacities to 40 GPM, to discharge pressures of 40 PSI and temperatures from —60° to +350° F.

For facts about a Vanton Sealless Plastic Pump for your process operation write for booklet #10A.

Vanton PUMP & EQUIPMENT CORP.

DIVISION OF COOPER ALLOY CORP., HILLSIDE, N. J.

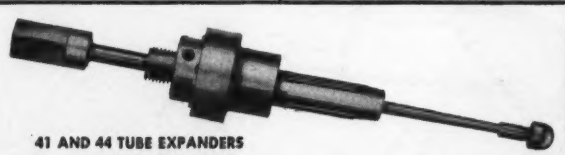
Check 3456 opposite last page.

BETTER TOOLS FOR BETTER WORK

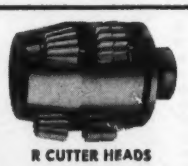
Wilsonize to economize— the buy-words in tube maintenance

EP REFINERY TYPE TUBE CLEANERS

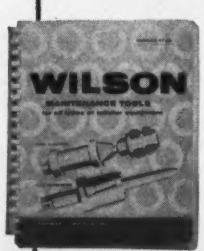
HEAVY-DUTY HEAT EXCHANGER CLEANER



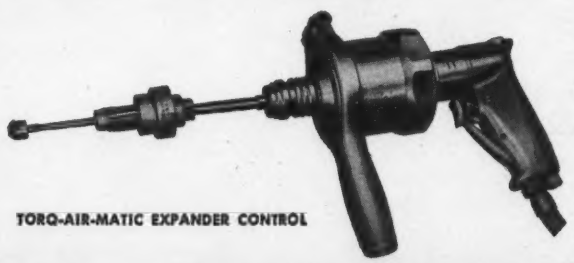
41 AND 44 TUBE EXPANDERS



R CUTTER HEADS



Wilson has hundreds more to meet every tube maintenance need. Send for comprehensive catalog 77-88.



TORQ-AIR-MATIC EXPANDER CONTROL

TW-914

THOMAS C. WILSON, INC. 21-11 44TH AVE., LONG ISLAND CITY 1, NEW YORK

Representatives in principal cities • Cable address: "Tubeclean", New York

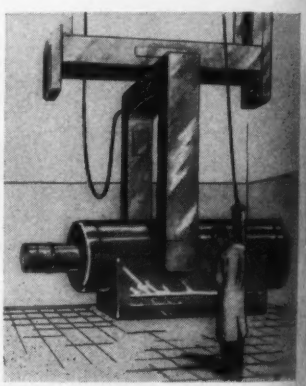
Check 3457 opposite last page.

X-ray foot-thick steel in minutes with huge linear accelerator

An 8-mev linear accelerator, to be installed at the A. O. Smith Corporation's Milwaukee, Wis., plant next spring, will be able to "see" through foot-thick steel and furnish photographic proof of the soundness of nuclear reactor core barrels and high pressure vessels.

The A. O. Smith model is expected to produce six times the radiographic intensity of the largest linear accelerator currently in use.

X-rays are produced by firing high-energy electrons (impelled by traveling radio-frequency waves) in a straight line down an evacuated tube. These "radar" pulses accelerate the electrons until they approach a speed of 186,000 miles/sec. At the end of the tube, the electrons strike a tungsten target and produce penetrating x-rays which are beamed upon the material to be examined.



Overhead crane permits raising of high voltage linear accelerator from floor level to a height of 16' for radiographing of huge pressure vessels and nuclear reactor cores

The operating head or tube of the linear accelerator will be 11′ long and 30″ in diam, with a 12″ radiation aperture.

Two Focal Spot Sizes

A choice of focal spot sizes of one mm and five mm, having respective outputs of 1500

To page 122

Simplified-Automatic
REFLUX
SPLITTER

for more accurate process control

COLUMN TYPE

IN-LINE TYPE

- Complete corrosion resistance
- Full visibility for ultimate product control
- Teflon gate is only moving part
- Solenoid and timer for accurate performance

Construction of Pyrex* and Teflon makes these Reflux Splitters completely corrosion resistant to all liquids except Hydrofluoric Acid and hot concentrated caustics. Eliminates valves, product line and reflux line rotometers for greater economy. Available in other materials of construction. Ask for Bulletin RS-2.

*T.M., Corning Glass Works

Chem Flow
CHEM FLOW CORP.
108 Paterson Avenue
Little Falls, N. J.

Check 3458 opposite last page.

CUT HERE AND FILE

Temperature of Mixtures

F. CAPLAN
Oakland, Calif.

The accompanying nomograph can be used to determine the temperature of a mixture of two gases or liquids. It is based on the equation:

$$(W_A)(C_p)(t_A - t_{A+B}) = (W_B)(C_p)(t_{A+B} - t_B)$$

or,

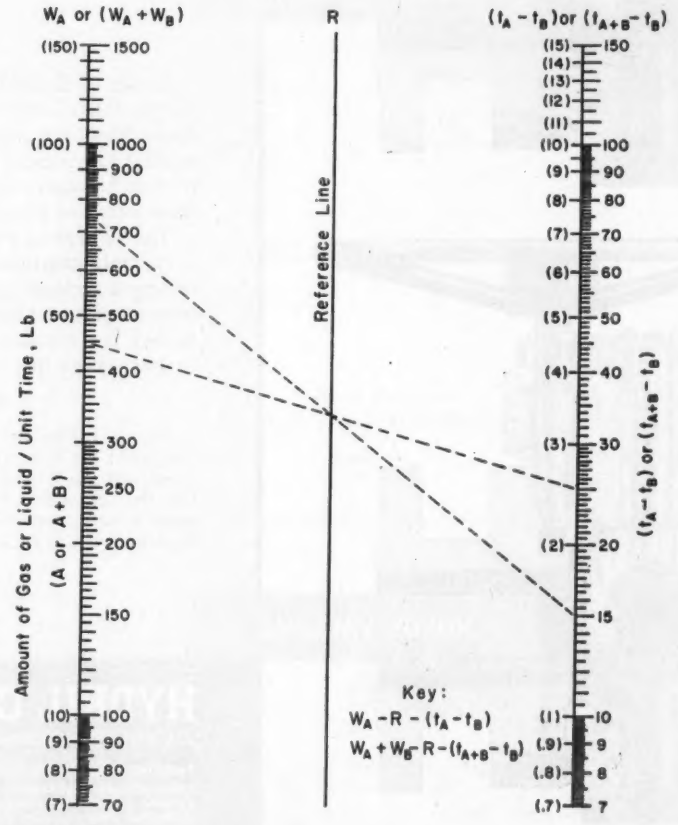
$$(t_{A+B} - t_B) = \left[\frac{W_A}{W_A + W_B}\right](t_A - t_B)$$

where: W_A and W_B = Amounts of gases or liquids per unit time to be mixed, lb

t_A and t_b = Temperatures of gases or liquids to be mixed, °F

Typical Example

If 300 lb of air at 10°F is mixed with 450 lb of air at 35°F, what is temperature of the mixture? Align $W_A = 450$ with $(t_A - t_B) = (35 - 10) = 25$. Next align intersection of this line at R-scale with $(W_A + W_B) = 750$. Read $(t_{A+B} - t_B) = 15$. Therefore, $t_{A+B} = 10°F + 15°F = 25°F$.



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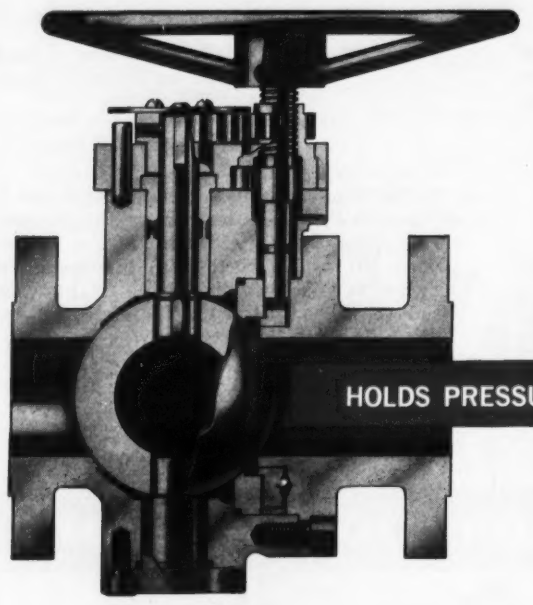
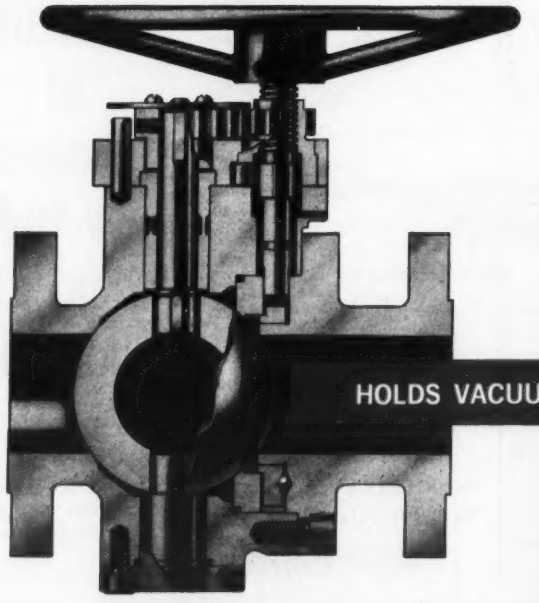
Exclusive Controlled Compressible Port Seal provides fast, positive shutoff in any service...





HYDRIL BALL Type "K" PLUG VALVES

Controlled sealing . . . a new concept in valve design . . . is the secret of Hydril's tight, bubble-proof shutoff. Hydril Ball-Plug Valves always seal positively against pressure from either direction—or against vacuum—because the fully confined packing ring is mechanically compressed between plug and seat when the valve is closed. This tightly compressed gasket type seal easily bridges clearances between parts as well as surface imperfections. Result: seal efficiency is unimpaired by prolonged hard usage, by rust or sediment.

Design of Hydril Type "K" Ball Plug Valves assures minimum maintenance costs. Non-lubricated, they employ no sealing lubricants. There's no sliding friction between plug and body to produce wear and abrasion.

The spherical plug is mounted on accurately positioned bearings, maintaining a minimal controlled clearance between plug and body. This contributes to easy, free-turning operation as well as to long service life.

●

Hydril valves are available in a wide range of sizes and ratings. Worm-gear and motor-operated models can be supplied. Get the full story on Hydril Valves from your nearby representative . . . or write Hydril Company for free Catalog No. V-60.

HYDRIL COMPANY

714 West Olympic Boulevard, Los Angeles 15, Calif.

Factories at: Los Angeles, Houston, Texas, Rochester, Pa.
Sales Offices: **California:** Bakersfield, Los Angeles, Ventura • **Louisiana:** Harvey, New Iberia, Shreveport **Oklahoma:** Oklahoma City, Tulsa • **Texas:** Corpus Christi, Dallas, Houston, Midland, Odessa • **Wyoming:** Casper **New York:** New York • **Canada:** Calgary, Edmonton

Check 3459 opposite last page.

IDEAS

From page 120

and 6000 roentgens/min, will be provided by the accelerator's x-ray source.

At full power and at a distance of 9′, the 5-mm focal spot source will x-ray an 11″ thickness of steel in about one min, or about 16″ of steel in about 18 min. The one-mm focal spot source will radiograph 8″ of steel in about one min, or 14″ in about 30 min.

A. O. Smith's present equipment would require more than an hour to x-ray only 3 to 4″ of steel, with less clarity or resolution.

A special building, now being constructed, with 6′-thick concrete walls will house the accelerator and special laboratories for processing and interpreting the films. The room housing the operating head of the accelerator will measure 40 x 80′, adequate to accommodate railroad flatcars carrying the material to be radiographed.

In operation, the unit's operating head will be suspended from an overhead crane to permit raising it from floor level to a height of 16′. It may be tilted to point its beam vertically downward or it can be rotated to 45° upward.

(High-voltage Linac is being built by the High Voltage Engineering Corporation, Burlington, Mass.)

Check 3460 opposite last page.

"No wonder it didn't kill them—these insects have developed gas masks!"

Can you use a unique, processed carrier... diluent... filler or absorbent

Whether you need a carrier for concentrates, or a diluent for adjusting bulk density or absorbent for liquids (atomic wastes), you'll find Pikes Peak Clay (available in Mesh sizes from −325 to ½") has an exceptionally low moisture content and remarkable pH of 5.

It is highly absorbent, less hygroscopic and has unmatched flowability. Pikes Peak Clay is currently being used as:

- **Carrier** (liquids and solids)
- **Diluent** • **Extender**
- **Coagulant aid**
- **Parting agent**
- **Coating agent**
- **Bleaching, animal, mineral and vegetable oils**
- **Filter aid**
- **Absorbent for liquids, chemicals, greases and oils**

Try the unique properties of Pikes Peak Clay. It can solve a practical production problem in your plant. Write today for samples and technical data, or call GRaceland 7-3071 to discuss your problem personally.

GRC GENERAL REDUCTION COMPANY
CHICAGO 6, ILLINOIS

Check 3461 opposite last page.

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processing and engineering **data**

Estimated Line Size for Flashing Steam-liquid Mixtures

MRS. P. D. SHROFF
Buena Park, Calif.

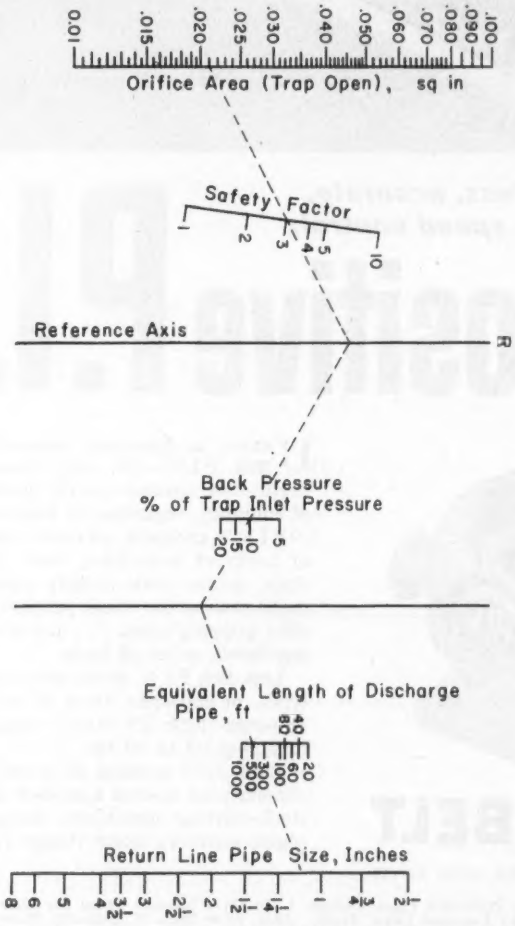
Normal methods of estimating line sizes for pipe carrying flashing liquids are tedious and complicated. This nomograph provides a quick way to determine line size of pipe carrying flashing steam-liquid mixture from steam traps.

Systems with multiple-steam-trap installations are handled by adding the orifice areas of all the traps and estimating the header size by using the total area.

For orifice areas greater than 0.1 sq in, divide the area by some convenient number and determine the area of pipe required from the nomograph. The chart is also applicable for line sizing of pipe carrying flashing mixtures from other blowdown or drain systems.

Typical Example

The example shown below is of a system with 500′ (equivalent length) of discharge pipe from a steam trap having orifice of 0.021 sq in, with a recommended safety factor of 3 and back pressure of 10% of trap inlet pressure. The return header size is between 1 and 1-¼," so use the larger size 1-¼"-diam pipe.



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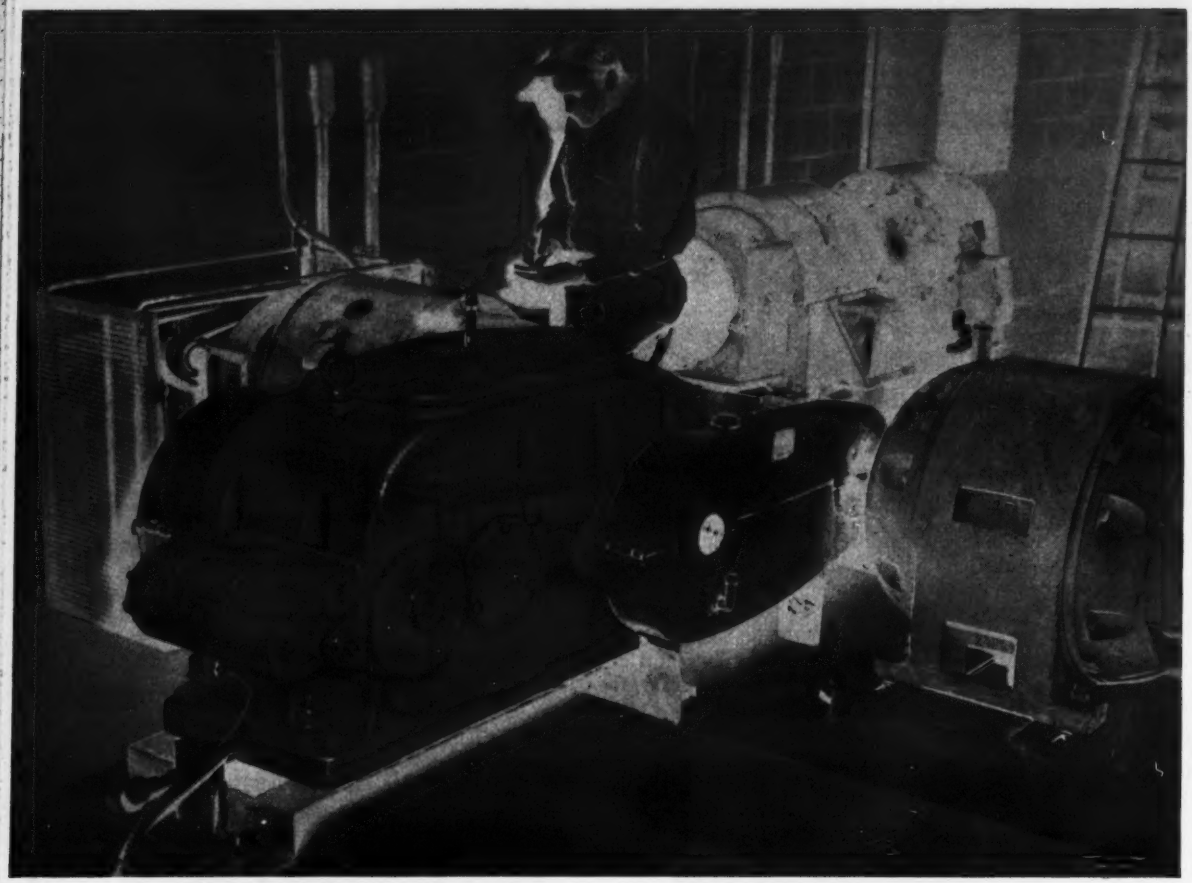


For stepless, slipless, accurate, infinitely variable speed control:

positive P.I.V. VARIABLE SPEED DRIVES

UNIQUE in operation, unmatched in accuracy! That's Link-Belt P.I.V.—the *only* chain-driven variable speed drive. Teeth—not tension—permit instant ratio changes with no loss of efficiency, regardless of load conditions.

P.I.V.'s exclusive all-metal, self-tooth-forming chain consists of packs of free-sliding steel slats which serve as teeth. The chain meshes with radially grooved wheels cut to a constant depth toward the wheel periphery. Beveled sides of the grooves offer gripping areas . . . provide a positive, nonslip contact at any speed, under all loads.

Link-Belt P.I.V. drives are available in 8 sizes and 16 standard types, in capacities from ½ to 25 hp—horizontal or vertical housings. Type RS P.I.V. variable speed drive is available in capacities up to 50 hp.

Book 2274 contains the complete P.I.V. story. For your copy, contact your nearest Link-Belt district sales office or authorized stock-carrying distributor. Refer to the yellow pages of your phone directory under Power Transmission Equipment.

P.I.V. LINK-BELT VARIABLE SPEED DRIVES

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 13,348

Check 3462 opposite last page.

NEW LITERATURE
Ideas and New Trends

Stable isotopes and stable-isotope labeled compounds are described along with a heavy-water lease/-purchase plan in Price List D — Bio-Rad Laboratories.

Check 3463 opposite last page.

Soot remover, an all-purpose fuel oil additive formulated to help cope with a vexing air pollution problem, is described in Bul 66 — Metropolitan Refining Company Inc.

Check 3464 opposite last page.

Plant facilities, company capabilities and biographies of technical personnel are contained in six-page bulletin which also details areas of company interests such as space weaponry, space-based systems, interplanetary communications, and nuclear reactors. Facilities Folder — Geophysics Corporation of America.

Check 3465 opposite last page.

Over 130 films, dealing with specific technical subjects and available on free loan, are listed in Technical Films Cat — Modern Talking Picture Service, Inc.

Check 3466 opposite last page.

Despite rising prices, products and services represent a better buy today than ever before, according to 32-page illustrated "The Story of Prices" booklet — E. I. du Pont de Nemours & Company Incorporated.

Check 3467 opposite last page.

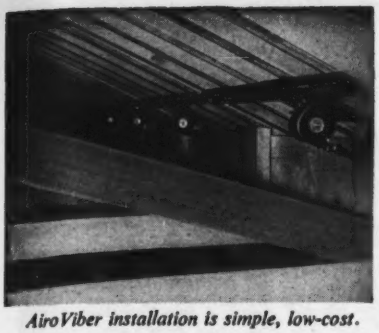
How to calculate the effectiveness of a partition or sound barrier is explained in 12-page engineering report which points up sound-retarding advantages of lead. Sound Barrier Bul — Lead Industries Association.

Check 3468 opposite last page.

Oil-base muds are covered in 76-page, pocket-size handbook which includes mixing formulae, treatment, test procedures, description of additives and instructions for care and handling of oil-base drilling fluids. Black Magic Handbook —Oil Base, Inc.

Check 3469 opposite last page.

Six fuel-cell types, proven feasible as electrical energy sources, are evaluated in an Air Force research report which cites advantages and limitations of different types, test results and other information. "Fuel Cells Systems" may be obtained for 50¢ from Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C.



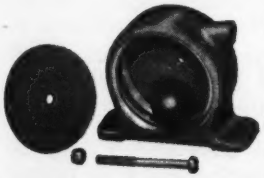
AiroViber installation is simple, low-cost.

Keep bulk materials MOVING!

Gain Quiet, Efficient Materials Movement and Low-Cost, Maintenance-Free Operation with AiroViber Vibrators!

Wherever you load, unload, move, package, process, grade or separate bulk materials, you can keep them MOVING with simple, ball type, pneumatically-operated AiroViber Vibrators!

- Start without fail.
- Trouble-free—only one moving part.
- Completely uneffected by surrounding conditions or temperatures.
- No lubrication needed.
- No periodic maintenance required.
- Speed is controlled by air valve.
- Amplitude can be altered.
- Where explosive conditions exist bronze balls may be used.



Steel ball (only moving part) rolls on hardened, ground track.

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VIBER COMPANY 726 S. Flower St. Burbank 46 California

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Pioneers and leaders in the manufacture of

VIBRATORS

Check 3470 opposite last page.

CUT HERE AND FILE

processing and engineering data

30

Vapor Pressure of Chloromethanes and Chloroethanes

JOHN B. GARDNER

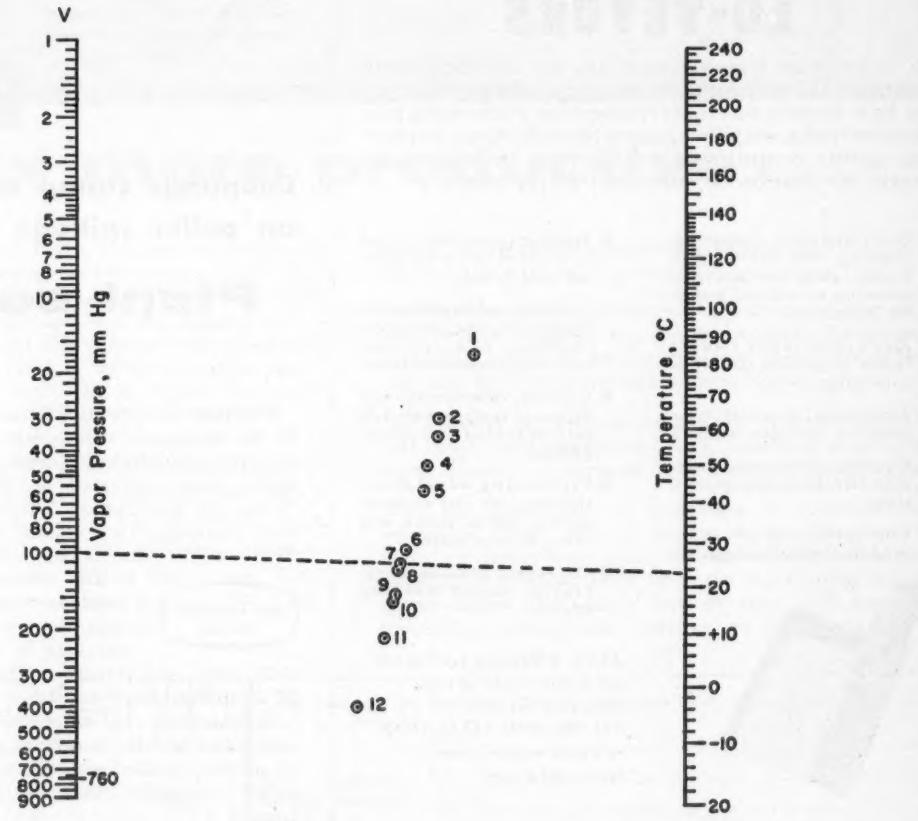
Lake Jackson, Texas

The Vapor pressures of any of the listed compounds can be found by drawing a straight line from the desired temperature, through the number of the compound in queston, and to the pressure line.

Typical Example

The vapor pressure of carbon tetrachloride at 23°C is 100 mm Hg.

1) Hexachloroethane, C_2Cl_6
2) Pentachloroethane, C_2HCl_5
3) 1,1,2,2 Tetrachloroethane, $C_2H_2Cl_4$
4) 1,1,1,2 Tetrachloroethane, $C_2H_2Cl_4$
5) 1,1,2 Trichloroethane, $C_2H_3Cl_3$
6) 1,2 Dichloroethane, $C_2H_4Cl_2$
7) Tetrachloromethane, CCl_4
8) 1,1,1 Trichloroethane, $C_2H_3Cl_3$
9) Trichloromethane, $CHCl_3$
10) 1,1 Dichloroethane, $C_2H_4Cl_2$
11) Dichloromethane, CH_2Cl_2
12) Chloroethane, C_2H_5Cl



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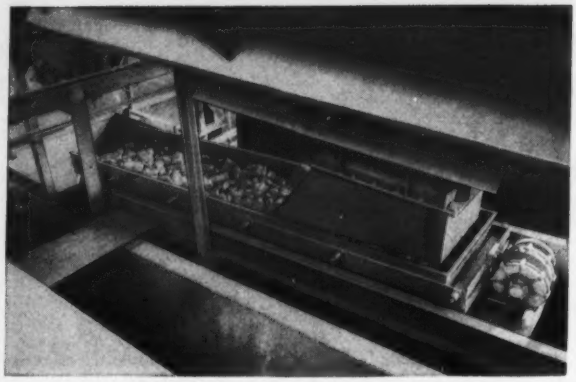


AJAX LO-VEYOR with built-in grizzly separates coke breeze prior to filling cupola charging bucket in large foundry

HOW YOU CAN DO MORE THAN SIMPLY CONVEY

WITH AJAX

VIBRATING

LO-VEYORS

In addition to their extensive use for conveying bulk materials, the following list gives just a few typical ideas on how manufacturers everywhere are performing production tricks, simplifying assembly techniques, improving quality control, and cutting costs by making the magic of vibration do more than simply convey . . .

1 Simultaneous conveying, aligning, and orienting of fragile glass containers to speed up automated assembly operations.

2 Reducing large friable lumps to particle size while conveying.

3 Separating irregular from standard circular washers.

4 Cooling aluminum dross, thus salvaging for reprocessing.

5 Conveying pulp mat in paper mills for uniform quality.

6 Feeding shredded wood in uniform layers for making wall board.

7 Cooling and breaking up enamel frit. Stainless steel conveyor pan prevents iron oxide contamination.

8 Cooling, dewatering, and drying of various materials such as rubber and plastic pellets.

9 Processing vegetables, shaking out dirt and separating leaves, stems, and other foreign matter.

10 Conveying fruits and vegetables under washing sprays.

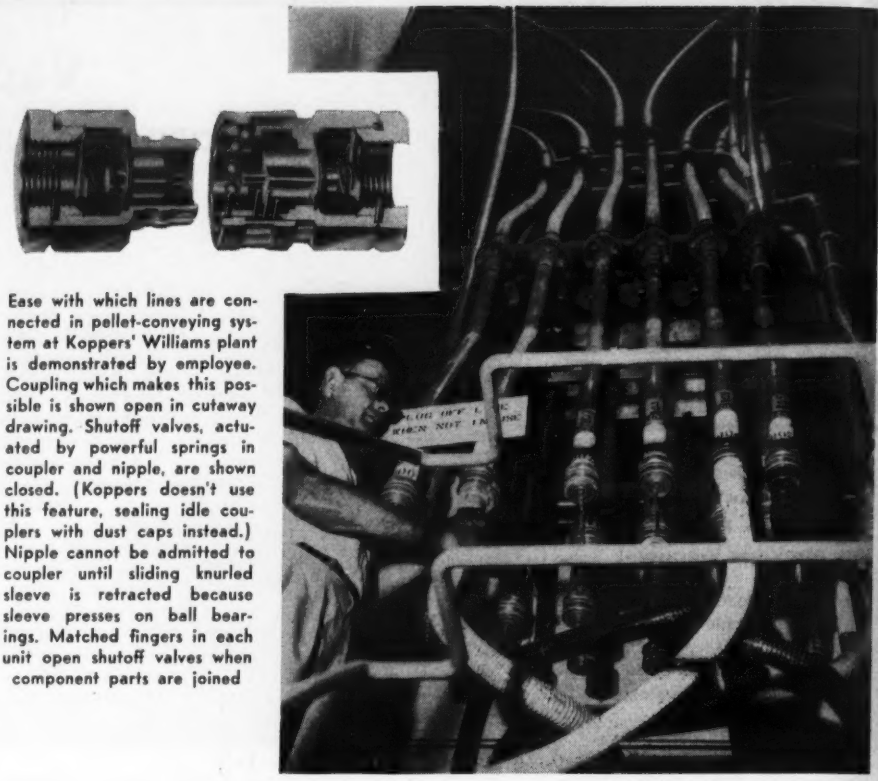
AJAX Vibrating Lo-Veyors are worth looking into. This new GUIDE TO PROPER SELECTION is worth writing for—write right now.

AJAX FLEXIBLE COUPLING CO. INC.
WESTFIELD, NEW YORK

REPRESENTATIVES IN PRINCIPAL CITIES

Check 3471 opposite last page.

cp MATERIAL HANDLING and PACKAGING



Ease with which lines are connected in pellet-conveying system at Koppers' Williams plant is demonstrated by employee. Coupling which makes this possible is shown open in cutaway drawing. Shutoff valves, actuated by powerful springs in coupler and nipple, are shown closed. (Koppers doesn't use this feature, sealing idle couplers with dust caps instead.) Nipple cannot be admitted to coupler until sliding knurled sleeve is retracted because sleeve presses on ball bearings. Matched fingers in each unit open shutoff valves when component parts are joined

Couplings clamp down on pellet spillage . . .

Plant saves $100 weekly

Problem: Recurrent failure of couplings in the pneumatic conveying system used to carry polyethylene pellets at the Williams plant, operated at Port Arthur, Texas, by the Plastics Division of Koppers Company, Inc., caused an estimated $100 weekly loss in materials.

A NEW SOLUTIONS FEATURE

The couplings were used for quick connection between crude lines, carrying ⅛" pellets from hold bins, and storage tanks. Altogther, 37 couplings were involved.

Spillage occurred when the locking device failed and the couplings parted while in service. Spilled material was contaminated irreparably, and also posed a fire hazard.

Solution: Alternative couplings were investigated and two-inch quick-connect-disconnect couplings ordered without shutoff valves in nipples or couplers. Dust covers are used to seal idle couplers.

Couplings provide positive seal which tightens as line pressure increases. (At Williams plant, pellets are conveyed at pressure of 3 to 10 psig.)

Connecting is accomplished easily by pulling back knurled sleeve on coupler and inserting nipple. Releasing sleeve locks two parts tightly. Pulling sleeve back and separating nipple and coupler disconnects them.

Results: All 37 couplers have been replaced. Couplings provide positive and leak-proof locking system and offer full-diameter flow.

Koppers officials estimate that changeover has effected savings of $100 weekly in material formerly lost by spillage and subsequent contamination.

(Series "H" two-inch couplings are manufactured by Snap-Tite, Inc., Union City, Pennsylvania.)

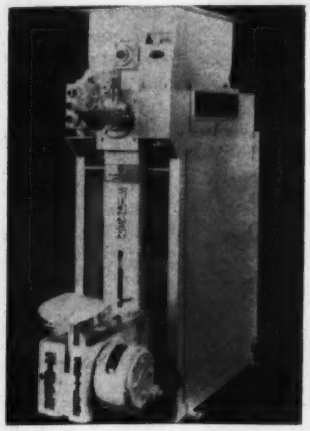
Check 3472 opposite last page.

Electronic accuracy linked with interchangeability of feeds in packer

True-scale beam features 100-to-1 scale leverage

Uses: Packages powdered, granular, pelleted or flaked materials in valve or open-mouth bags and drums.

Features: True-scale beam features a 100-to-1 scale leverage which provides sensitivity of as little as ¼ oz



Electronically-governed packer

actuation of an electronic sensing capacitor. It functions without direct electrical connection or sparking.

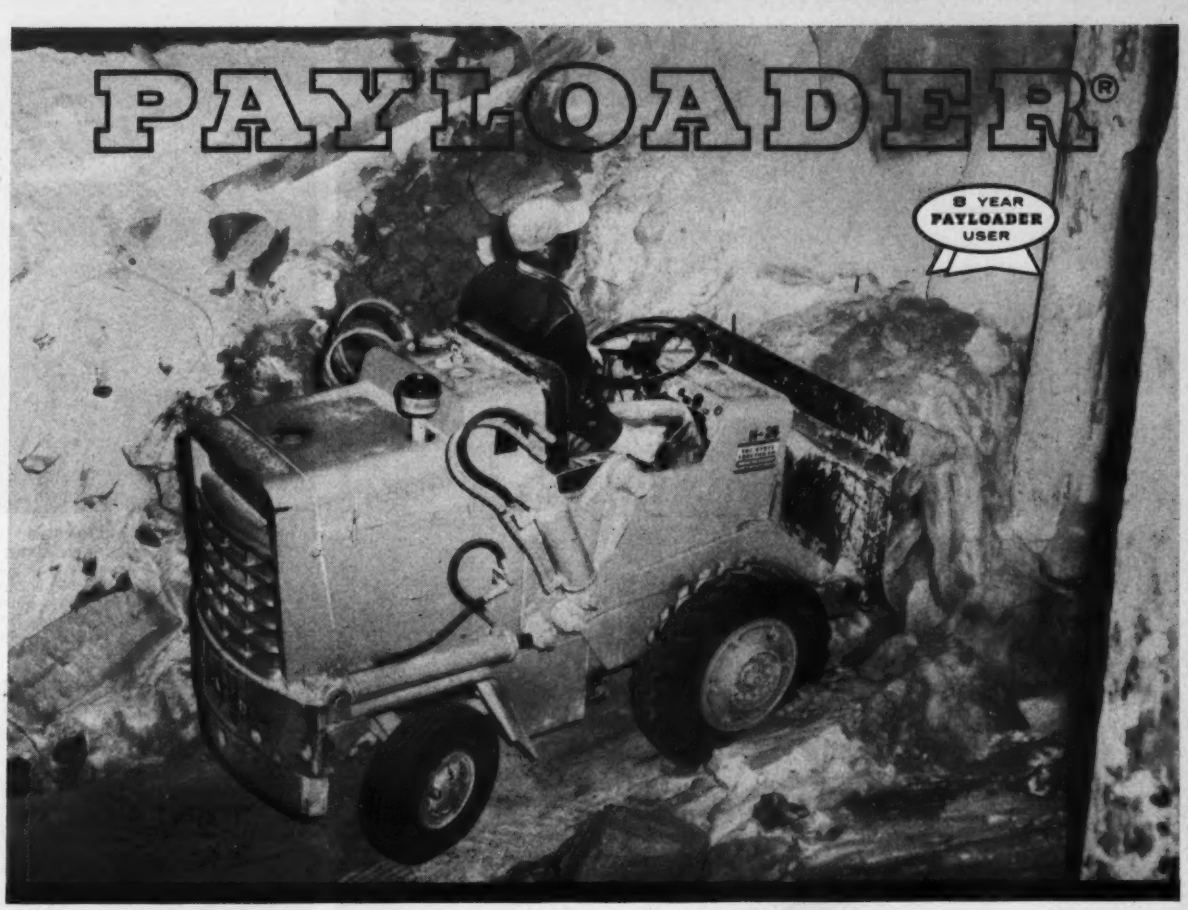
Description: Hoppers and feed systems are quickly interchangeable. Delivery screw may be changed without tools in one min to accommodate a variety of materials.

An over-under weight indicator is located beside the bag spout for checking or trimming the pack by the turn of a knob — without adjusting poise weight.

Among accessories are: automatic starting, interchangeable hoppers, interchangeable delivery screws, special settlers which do not affect the scale mechanism, caster lifts for mobility and attachments for various bag and drum mouths.

(DX packer is described in six-page brochure available from H. L. Stoker Company, PO Box 112, Claremont 64, Calif.)

Check 3473 opposite last page.



H-25 is more productive . . .

At Farmers Warehouse in Leary, Ga., annual production of chemical fertilizer averages 12,000 tons. Since 1952 this firm has used PAYLOADER tractor-shovels to unload boxcars, stockpile materials and feed the bagging operation. They owned 6 Model HA units in 1958 when they bought their first Model H-25 (2,500-lb. operating capacity) PAYLOADER. Plant Sup't. W. R. Owen, Jr., relates what has happened since:

"We previously needed 6 HA's for the various phases of our operation. Now we get more production from only 4 machines — 3 H-25's and 1 HA. The terrific breakout action of the H-25 heaps the bucket load with minimum machine effort . . . gives more digging traction and faster delivery for greater overall production. Service from all our PAYLOADER units has been very good."

Speed and Mobility are the big reasons the H-25 PAYLOADER is the production champion in its class.

Fast Loading with a power-transfer differential that gives more reliable digging traction by reducing drive-wheel spin-out . . . 4,500-lb. breakout force at the bucket cutting edge and 40° bucket tip-back at ground level.

Fast Travel with power-steering, a 6-ft. turning radius and full power-shift transmission with matching torque converter provides 2 forward and 2 reverse speed ranges.

Why not investigate the possibility of reducing your equipment "fleet" too? A nearby Hough Distributor is ready to demonstrate how the outstanding production capacity of a Model H-25 or larger PAYLOADER can increase output and reduce costs in your bulk handling operations. Contact him today, or use the coupon below.

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LIBERTYVILLE, ILLINOIS
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Check 3474 opposite last page.

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Tyler fabricates screen sections to fit every existing type of vibrating screen. This aggregate cloth is drawn from inventory, quickly fabricated to give you fast delivery. Tyler-developed hook strips maintain drum-head tension for long service life.

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The Tyler Customer Service Laboratory keeps on file data and samples from years of evaluating screening problems. When you have a new application, check Tyler for technical recommendations based on experience and thorough evaluation.

Wire cloth so finely woven it screens out light!

Openings in this woven wire cloth are so tiny they're specified in microns—millionths of an inch. This is Tyler stainless steel wire cloth, 325 x 2300 mesh, used in filtering fuel in aircraft engines. Whatever your special needs in wire cloth, Tyler can supply you from the world's broadest line—covering thousands of different specifications.

TYLER CUTS YOUR COST OF SCREENING

• Requirements matched from world's broadest line of wire cloth • Fast shipments from the industry's largest inventory • Technical service backed by unique Customer Service Laboratory.

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Check 3475 opposite last page.

WHAT DO YOU THINK?

Opinions and comments on the significant subjects carried in each month's CHEMICAL PROCESSING are important! We *welcome* your letters expressing your views.

Many CP readers are taking the opportunity to state their views on today's top questions.

By publishing your letters in CHEMICAL PROCESSING, others will have the opportunity to hear your side.

Perhaps you agree

with what has been written in these articles.

Maybe you don't.

You might even have a thought or angle which wasn't expressed.

If so, why not let us and others hear your ideas? Suitable letters will be published in our regular "Letters from Readers" column. (See page 16.)

Address your comments to:

The Editor
CHEMICAL PROCESSING
111 E. Delaware Place, Chicago 11, Illinois.

▸ A NEW SOLUTIONS FEATURE

Coarse starch conveyed pneumatically with $5000/yr savings

Problem: Replacement costs amounted to more than $5000/yr for a rubber belt conveyor used by American Maize-Products Company, Roby, Ind., to convey coarse starch weighing 31 lb/cu ft at rates of 7500 lb/hr.

Not only did temperature changes cause the belt to occasionally jump the track, stalling production; but also maintenance was expensive since there were many pulleys to be greased and belts to be repaired. The power demand was another expense factor to be considered.

Solution: After considering alternative conveying methods, a high density pneumatic conveying system, designed to be 99.5% efficient, was installed.

This positive pressure system has the same capacity as its predecessor. Starch moves from the apron of a dryer to a chain conveyor and into a small transition hopper. It then falls to a 10 x 8 rotary vane feeder valve of cast bronze construction with square inlet and outlet. The rotor is a deep-pocket-type design, displacing 0.27 cu ft per revolution.

Starch is carried for a total lift of 70′ and a horizontal run of 340′ to a 20″ long cone, high-efficiency-type collector, where the starch is separated from the air and dropped to a hopper for further processing. A secondary drop-off point is provided 150′ from the pick up line so starch can be diverted to a special milling installation when product specifications demand a finer particle size.

Results: Replacement costs of approximately $5000 per year have been eliminated and maintenance minimized by the pneumatic system which operates around the clock 24 hr/day, five days per week. In addition, product degradation has been minimized.

(Pneu-Flo conveyor system is a development of Sprout, Waldron & Co., Inc., Muncy, Pa.)

Check 3476 opposite last page.

For Materials Handling or Refuse Collection

DINOSAUR + DINOMASTER

Handles (in addition to DINOMASTER) containers eight through 40 cu. yd. capacity and over

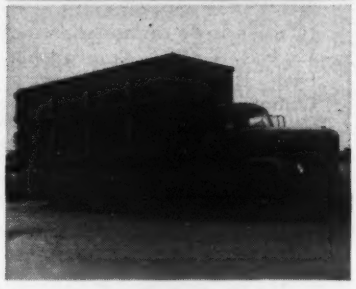
When mounted on DINOSAUR, provides "No-Container-Haul" Service for refuse containers, one through eight cu. yds.

Besides serving DINOMASTER, the DINOSAUR picks up huge loads in big capacity containers . . .

DINOSAUR picks up DINOMASTER hydraulically for refuse container service.

extremely heavy materials in smaller containers . . .

DINOMASTER engages loaded container and lifts it into emptying position.



. . . and can even handle two containers at a time for additional flexibility.

Contents fall into body where up to 85,000 lb.* pressure packer plate compresses material to a fraction of its former volume.

*On 30 yd. Model

Mfd. Only By

DEMPSTER BROTHERS

Inc.

Dept. CP-4 KNOXVILLE 17, TENNESSEE

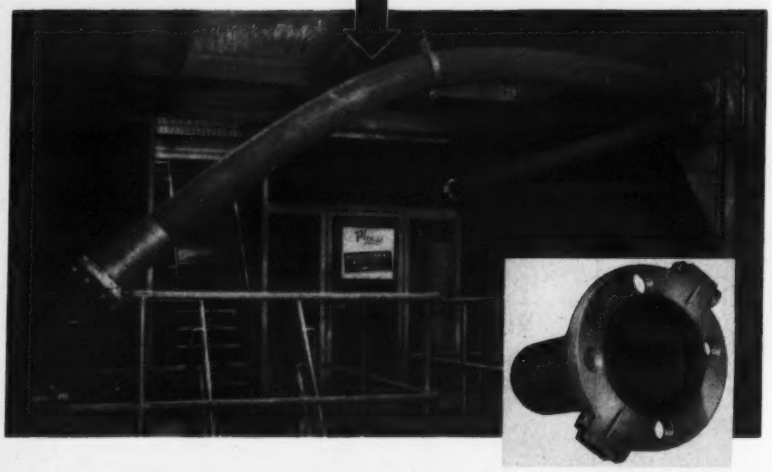
PART OF THE DEMPSTER DUMPSTER® SYSTEMS

WRITE TODAY FOR COMPLETE INFORMATION

Check 3477 opposite last page.

This is

"KEMITE"



FLEXIBLE RUBBER PIPE

With These Important Advantages:

- Handles highly abrasive and corrosive materials, hot or cold, wet or dry.
- Excellent flexibility permits *curves* instead of frequent intermediate connections.
- Necessary connections simplified by use of "Flang-Lok" Flanges, providing non-metallic, leakproof joints.
- Patented wire-reinforced carcass will not kink or collapse.
- Tough, durable cover impervious to effects of acids and fumes.
- For suction and discharge. Standard sizes 1" to 4".

Contact Our Nearest Branch for Details and Prices

"If it's GOODALL, it MUST be Good!"

See Page 350-51, Chemical Engineering Catalog

Manufacturers of Mechanical Rubber Products—Since 1870

Standard of Quality HOSE · BELTING · FOOTWEAR CLOTHING · EXPANSION JOINTS · PACKINGS · LINERS, ETC.

GOODALL *Rubber Company*

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N.J.
Branches and Distributors Throughout the United States and in Canada

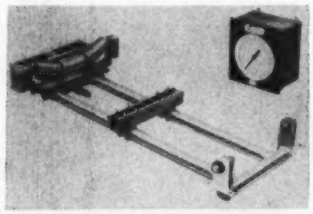
Check 3478 opposite last page.

Scale automatically weighs and controls bulk flows

Uses: Automatically weighs, measures, meters and/or controls flow of bulk materials on conveyor belts.

Features: Scale is adaptable to such measurement, control and recording operations as continuous product inventory, rationing or blending of additives, segregation control and bulk destiny determination.

Description: Unit consists of a conveyor-mounted idler-supported carriage installed to support one idler in the conveyor which weighs the belt and material carried on that idler, and a remote indicating and recording instrument which may be mounted anywhere up to 500' from the carriage.



Conveyor scale consists of carriage (left) and remote indicating and recording instrument (right)

Convenient adjustments for zero and calibration are contained within the instrument, and a range of full scale capacities from 8.6 to 250 lb/ft of belt is available for standard models.

(Complete information on Vey-R-Weigh is available from Ramsey Engineering Company, 1853 W. County Rd., St. Paul 13, Minn.)

Check 3479 opposite last page.

Foil adhesive eliminates costly clean-up time

Heat-sealable adhesive for aluminum foil is credited with eliminating the need for cementing machines and clean-up time required when using liquid adhesives while packaging.

Adhesive can be applied by spray, roller coater or brush and dries completely transparent. When foil is placed in contact with itself or other surfaces, an instantaneous bond is obtained by applying heat. Adhesive is packaged in 55-gal drums and in 5-gal and 1-gal containers.

(Rubba-Foil adhesive is being marketed by Rubba, Incorporated, 1015 E. 173rd St., New York 60, N.Y.)

Check 3480 opposite last page.

Pump replaces collectors, blowers and ducts in enclosed conveyor

Performance capacities rated up to 24,000 lb/hr

Uses: Conveying dry, powder like materials through totally-enclosed piping system.

Features: System can be installed at savings up to half the cost of comparable pneumatic systems. Performance capacities range to 24,000 lb/hr.

Description: "Progressing cavity" pump operates on principle similar to that of precision screw conveyor, with cavities being formed between helical rotor and double helical stator during rotation, moving toward discharge end. Like piston moving through cylinder of infinite length, its performance is smooth, free from turbulence, with positive displacement and continuous, uniform flow suitable for metering purposes.

"Progressing cavity" pump replaces blowers, ducts, and dust collectors in conveying system

System will function effectively in runs up to 200' or longer and it is capable of vertical lifts of more than 75'.

Small amounts of injected air are usually advised for systems to reduce friction between powder particles. Fluidizing hopper (used on most

applications) imparts flow characteristics to powder being sucked into pump, while air in fluidizing chamber helps to keep material flowing into rotor-stator elements. Air at discharge port helps maintain system-working pressure of 3-12 psig.

Minimum air requirements simplify problem of removing excess air at delivery point. Low velocity minimizes compaction of powder.

(Pump conveying system is development of Moyno Pump Division, Robbins & Myers, Inc., Springfield, Ohio.)

Check 3481 opposite last page.

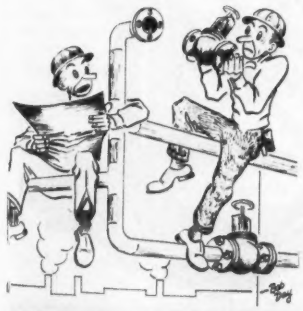
Aerosol packaging line fits on table top

Compact aerosol packaging line, suitable for "do-it-yourself" packaging, can be installed together with necessary auxiliary equipment for under $6000. Line has a capacity of over 400,000 units/yr.

It consists of a concentrate filler, crimper for standard 1" valve, and propellant pressure filler with accumulator and propellant handling pump, mounted on a stainless steel table in a 30" x 6' floor space.

(Further information on Compact Aerosol Packaging Line can be obtained from The Kartridg Pak Co., 800 W. Central Rd., Mt. Prospect, Ill.)

Check 3482 opposite last page.



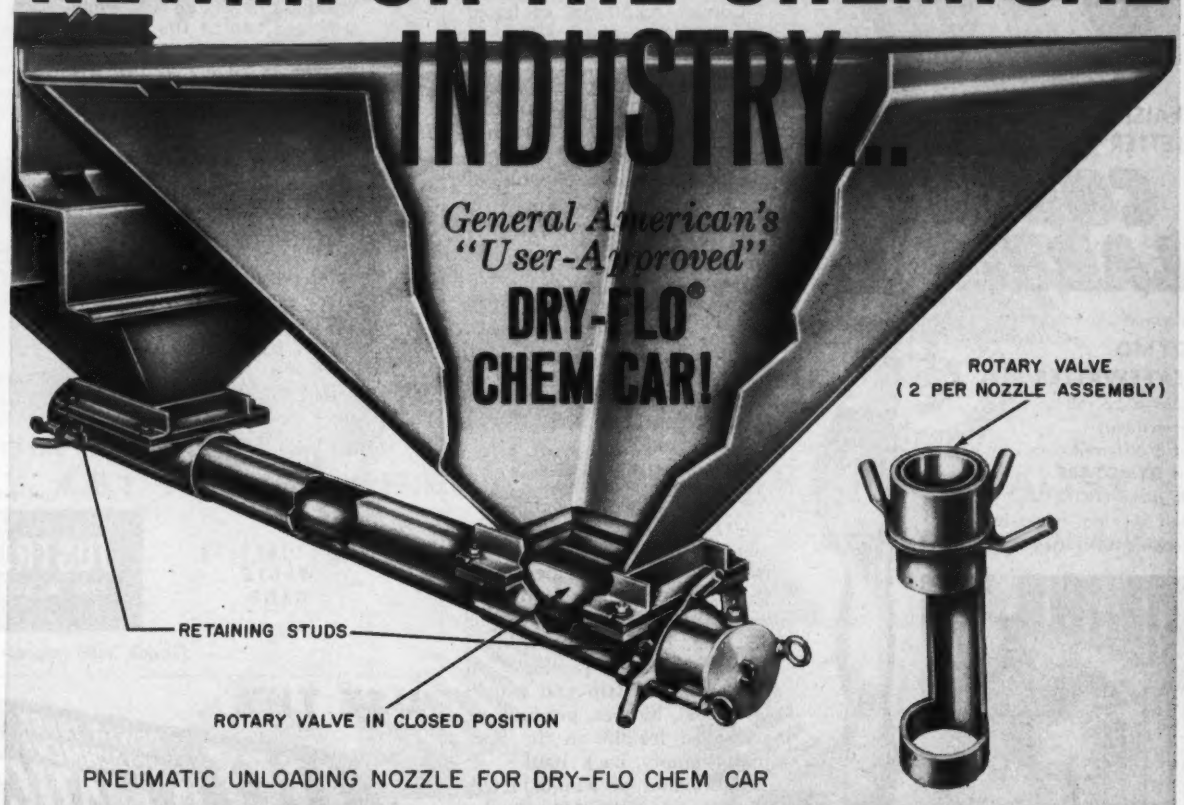
"Here it is! 'For valve wheel position, see Detail Z, Drawing Q-1313."

Bob Day, U.S. Industrial Chemical Co.

NEW...FOR THE CHEMICAL INDUSTRY...

General American's "User-Approved"

DRY-FLO® CHEM CAR!



PNEUMATIC UNLOADING NOZZLE FOR DRY-FLO CHEM CAR

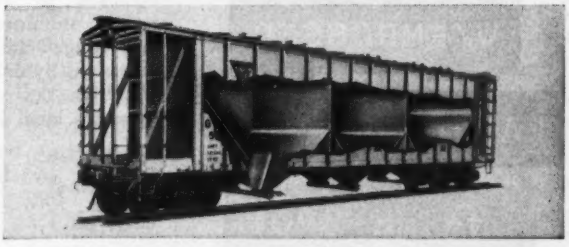
Designed especially for dependable, safe bulk shipment of polyethylene, polystyrene, polypropylene and similar chemicals in dry form.

The new 3,500 cu. ft. capacity Dry-Flo Chem Car was developed for the chemical industry to provide a car which would assure freedom from contamination and moisture pick-up while in transit and during unloading.

The car is welded throughout, has fully-gasketed openings, unloading nozzles (created especially for pneumatic unloading) designed for fast disassembly–speedy and complete cleaning. Also the car is divided into three separate compartments.

Illustrated is a schematic view of the new, exclusive General American unloading nozzle Unloading flow can be controlled to accommodate individual unloading systems. Three outlets are provided on each car, thus requiring fewer connections and adjustments, minimizing the possibility of contamination.

275 of these cars are already in service or on order. If you would like further information on the Dry-Flo Chem Car, write to . . .



Airslide® and Dry-Flo® Car Division

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South La Salle Street • Chicago 3, Illinois

Offices in Principal Cities

DRY-FLO GENERAL AMERICAN TRADE MARK

Check 3483 opposite last page.

Special Introductory Offer
FOR A LIMITED TIME ONLY

$5.00 OFF

on a complete kit for making

RAISED LETTER **COLOR CODING LABELS**

You get any model **DYMO TAPEWRITER** plus a 12 roll assortment of 8 different colors of **DYMOTAPE** to make on-the-spot self-sticking, raised-letter labels, 1001 uses!

VISUAL

IDENTIFICATION

W/EMBOSSED

LABELS...MADE

ON-THE-SPOT

Five models from $34.95

see your distributor or write to

DYMO
INDUSTRIES, INC.
Dept. CP-4
2950 Seventh St., Berkeley 10, Calif.

Check 3484 opposite last page.

HANDLING & PACKAGING

Both liquid, dry cargo hauled by aluminum two-way trailer

Carries 7,250 gal of liquid plus 710 cu ft dry cargo

An underslung aluminum tank with a 7250-gal-capacity is combined with a 710-cu-ft dry cargo-carrying area in dual cargo trailer capable of transporting dry or liquid products payload of 42,600 lb.

Versatile trailer carries both liquid and dry cargo

Dry cargo portion is enclosed with 3′ high side and end boards. Tandem-axle trailer stands 10′ high and weighs 10,715 lb empty. It is 42′ long. Trailer is being used to carry liquid products on the outbound trip and return with coal, lumber, produce, or packaged freight on the normally empty back haul.

Fabricated of aluminum sheet and extrusion, trailer features rectangular tank extending length of unit with bottom sloping downward from each end toward center. Interior bulkheads separate tank into four compartments.

Flat tank top measuring 7′3″ wide serves as top side dry cargo floor. Dry cargo area, enclosed by removable extruded aluminum side boards and hinged tailgate, may be increased by using side boards 5′6″ high. Entire unit will then measure legal height of 12′6″.

(Dual-cargo trailer is manufactured by Standard Steel Works, Inc., North Kansas City, Mo.)

Check 3485 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

JUSTRITE SAFETY CANS AND OILY WASTE CANS

. . . safety-proved in hundreds of plants!

The hazards of fire and explosion are two of the greatest dangers to plant safety. For more than 50 years, JUSTRITE has specialized in the development and manufacture of safety cans that have Underwriters' Laboratories and insurance companies' approval. Why not standardize on the safety equipment that has been proved in thousands of situations?

OILY WASTE CANS

SAFETY CANS

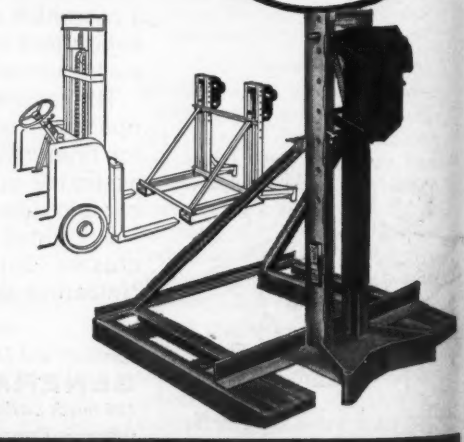
IMPROVED PLUNGER CANS

ASK YOUR INDUSTRIAL DISTRIBUTOR

JUSTRITE MANUFACTURING COMPANY
2061 N. SOUTHPORT AVE. · CHICAGO 14, ILL.

Check 3486 opposite last page.

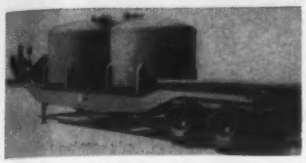
USE THE POWER TRUCK ATTACHMENT **LIFT-O-MATIC** for HANDLING DRUMS with a POWER FORK TRUCK WITH FORKS LEFT ON OR REMOVED



Simple, automatic, mechanical handling of any size or type of drum—single or multiple.

WRITE FOR CATALOG . MARVEL INDUSTRIES, Inc.
2234 CLEVELAND ST., EVANSTON, ILLINOIS

Check 3487 opposite last page.



Unloading time halved

... by twin-tank dry bulk materials trailer equipped for self-unloading by air of up to 4000 lb/min through a 4" pipe.

By utilizing high pressure with low air volume, material is forced through the unloading pipe in a high-density condition. In addition to powdered materials, trailer also handles granular products.

(Jet-25 twin-tank dry bulk materials trailer is a development of The Heil Co., Milwaukee 1, Wis.)

Check 3488 opposite last page.

NEW LITERATURE
Material Handling and Packaging

Packers for continuous packing of bottles, cans or jars in return cases or shipping cartons and for casing all popular can or bottle wrap-around packs in shipping trays or flapped cartons are given complete treatment in six-page Bul CP-702 — Geo. J. Meyer Manufacturing Co., distributor for Atkron, Inc.

Check 3489 opposite last page.

Pros and cons of such subjects as specials versus standard trucks, pallet versus palletless handling, and how to select the right truck for the job, are subjects of 80-page booklet which sums up cost-cutting material handling ideas. Cost-cutting Ideas Handbook — Automatic Transportation Company, division of The Yale & Towne Manufacturing Company.

Check 3490 opposite last page.

Engineering techniques used by seven major manufacturers for bulk handling of plastic resins in hopper-car quantities is subject of 24-page booklet. Report describes how volume plastic resins users have achieved cost savings and other in-plant advantages by incorporating bulk-handling engineering methods in existing and new layout. Hopper Car Handling Bul — Plastics Division, Monsanto Chemical Company.

Check 3491 opposite last page.

FOR EXAMPLE, IS YOUR PROBLEM A MORE EFFICIENT METHOD OF MOVING *AND* COOLING HOT MATERIALS... MOVING *AND* DRYING MATERIALS? Your Carrier Vibrating Equipment Specialist has the specialized know-how that can fill the gap between problem and solution... between raw material and finished product... efficiently and economically.

Using the Carrier exclusive Natural Frequency Principle, vibrating equipment can be designed that will move hot materials, cool them en route, distribute or separate them... In one operation. Or others can be made that will elevate, dewater and dry *while* moving.

Why not have your Carrier Specialist study your operations with a view to reducing handling costs while increasing over-all efficiency. Remember, Carrier does more than just build equipment... we provide the specialized service that solves problems of moving and processing materials efficiently.

Call him or write Carrier Division of CHAIN Belt Company, 229 N. Jackson St., Louisville 2, Kentucky.

FOR ECONOMICAL MATERIALS MOVING
SEPARATING • FEEDING • DRYING • DEWATERING • COOLING
QUENCHING • COATING • DISTRIBUTING • ELEVATING

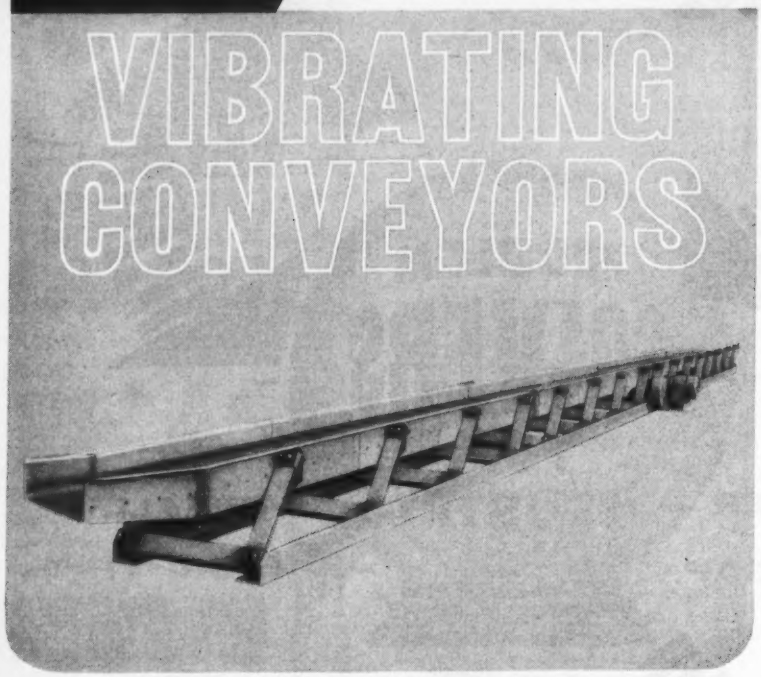
CARRIER
NATURAL FREQUENCY
VIBRATING EQUIPMENT

Check 3492 opposite last page.

HIGH SPEED CONVEYING OF BULK MATERIALS

SYNTRON MECHANICAL

VIBRATING CONVEYORS



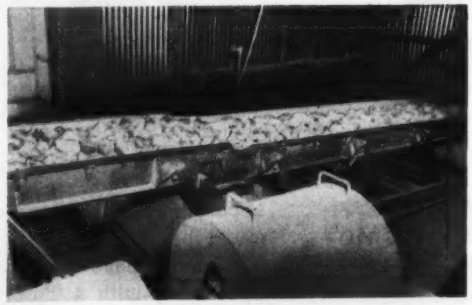
SAVE BULK MATERIALS HANDLING COSTS

Chemical and Food Plants throughout the nation are recording big monthly savings in operating and maintenance costs by using Syntron Mechanical Vibrating Conveyors.

Designed to handle most bulk materials efficiently at high ton per hour rates—bulk chemicals, resins, plastics, foods, and other materials—constructed to withstand the wear and abuse of every day operation; built for long, dependable service with a minimum of maintenance.

Syntron manufactures a full line of conveyors in various lengths and widths—a conveyor for every job.

Investigate the possibilities of Syntron Mechanical Vibrating Conveyors in your operation.



Vibrating Conveyors—handle fines, granules, or chunks—damp or dry, hot or cold—provide a constant, high speed flow of materials.

Write for a Syntron Catalog today

61VC1

SYNTRON COMPANY
110 Lexington Ave. • Homer City, Pa.

Other Syntron equipment of proven dependable quality

Bin Vibrators

Spiral Elevators

Vibratory Feeders

Check 3493 opposite last page.

HANDLING & PACKAGING

Rotary feeder, which delivers dry, pulverized and granular materials into low air volume, high-pressure pneumatic conveying systems with efficiencies up to 98.4%, is introduced in Bul F-8 — Fuller Company, subsidiary of General American Transportation Corporation.

Check 3494 opposite last page.

Aerosol-filling processes are outlined and points to be considered in evaluating product for aerosol packaging are discussed in Sprayon Bul—Sprayon Products, Inc.

Check 3495 opposite last page.

Installations and typical specifications of metal-mesh conveyor belts are covered in Bul 116 — The Cambridge Wire Cloth Company.

Check 3496 opposite last page.

Results of testing screw feeding equipment performance with 456 different dry materials, ranging from abrasives to zinc stearate, are reported in eight-page Performance Bul — Vibra Screw Feeders, Inc.

Check 3497 opposite last page.

Pneumatic conveyors, including negative and positive pressure systems, closed circuit systems and a variety of special applications, are illustrated and described in eight-page Bul P-259-A — Young Machinery Company.

Check 3498 opposite last page.

Liquid fillers, featuring air-lock valve designed to improve filling accuracy and provide flexibility, are described in Bul G-596 — Cherry-Burrell Corporation.

Check 3499 opposite last page.

Industrial truck leasing, including five optional programs, is subject of Custom Leasing Plan Bul — Hyster Leasing Div., Hyster Co.

Check 3500 opposite last page.

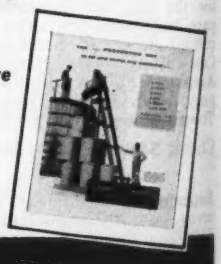
"Boy! Was I ever busy, today!"

CESCO DUMPERS

for lifting and dumping drums, bags, skid boxes, boxes, barrels and trucks

- **Handles powders, granulars, stampings, castings, ceramics scrap, sugar, fruits and liquids of heavy viscosity**
- **Operates at lifting heights from 12" to 50'**
- **Rated capacities from 100# to 5000# dependent upon unit**
- **Benefits—manual labor reduced, easy loading, speedy dumping, and reduced job accidents**
- **Empties into mixers, tanks, tumblers, chutes, conveyors, hoppers**

Write for comprehensive six page dumper bulletin



CONVEYORS & DUMPERS, INC.
DIVISION OF MERCURY INDUSTRIES, INC.
P. O. BOX 111, HILLSDALE, NEW JERSEY

COLSON EQUIPMENT & SUPPLY CO.
1317 Willow Street, Los Angeles 13, Calif.

Check 3501 opposite last page.

THAT'S INTERESTING

Stops some colds cold

All cold symptoms are reportedly controlled by Win-Codin, a prescription tablet currently being introduced to the medical profession by Winthrop Laboratories.

Tablets contain five ingredients: codeine, Neo-Synephrine, aspirin, chlorpheniramine maleate and ascorbic acid.

Aluminum in autos up

Use of aluminum in U.S. cars increased from 54.4 lb in 1960 to 62.8 lb for 1961 models, according to Aluminum Company of America.

If all of the aluminum parts currently being manufactured for various cars were combined in one, 250 lb of the light medal could be used in a car today.

Oldsmobile's F-85 uses more aluminum (159 lb) than any other car.

For more information on product at right, specify 3502 see information request blank opposite last page.

Pivot-action steering axle is an outstanding feature of new Towmotor "Monarch" Series fork lift trucks (above), with load capacities up to 24,000 pounds. Fast, smooth maneuvering results from Monarch's wider track axle pictured below. It pivots in rubber to absorb road shocks.

TOWMOTOR'S ON THE MOVE

—leading the way with big fork lift trucks that offer new mass-handling techniques. Heavy duty trucks with "unitized" frame and body for a long lifetime of low-cost maintenance. Lift trucks engineered for extra road and load visibility, better maneuverability, easier operation. Move more with Towmotor fork lift trucks—made only by TOWMOTOR CORPORATION, CLEVELAND 12, OHIO.

TOWMOTOR
THE ONE-MAN-GANG ®

Rugged Design... Easy-to-Handle Balance

RIDGID®

HEAVY-DUTY

PIPE CUTTERS

give faster, straighter cuts

Five Sizes for ⅛" to 6"

Pick up a RIDGID Heavy-Duty Pipe Cutter, and you'll instantly know why it makes pipe and conduit cutting far easier. Perfectly balanced . . . gives you a feel of confidence no other cutter can match. See the extra-long shank that protects handle threads . . . assures easy pressure application. Feel the large, smooth handle that gives you a comfortable, powerful grip. Try it, and you'll find a built-in cushion to keep the cutter wheel "on track" through hard or uneven spots. Rugged frame, guaranteed not to break or warp, stays straight for clean cuts every time.

You'll Want a RIDGID 4-Wheel Pipe Cutter for Work in Tight Places!

Call your Distributor today. For your convenience, he maintains a complete stock of RIDGID Work-Saver Pipe Tools and parts!

RIDGID

The Ridge Tool Company • Elyria, Ohio, U.S.A.

Check 3503 opposite last page.

Maintenance downtime is low with the pulseless positive-displacement pump used by Sapolin Paints, Inc. The key: a diagonally split casing which permits easy access to pump internals without disturbing pipe connections

Is rough pumping of sensitive products costing you money?
Here's a report on one way to . . .

Gently pump shear-sensitive paints

Problem: Pumping latex paint formulations by conventional methods put excessive stress on product to cause coagulation and paint waste at the Brooklyn, N.Y., plant of Sapolin Paints, Inc.

A NEW SOLUTIONS FEATURE

Solution: A positive-displacement pump was installed to handle the shear-sensitive paints. The pump's design results in a non-foaming pulseless axial flow.

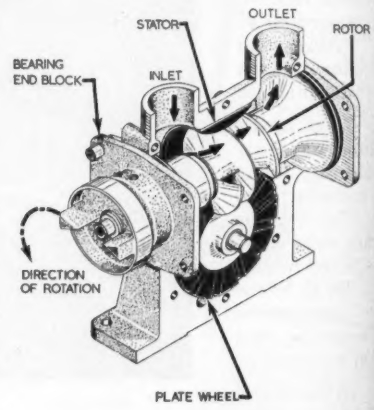
Sapolin's pump is constructed of stainless steel and Buna-N (for the plate-wheel wipers). Tapered roller bearings on both ends of rotor shaft permit operating speeds to 3600 rpm. Self-priming unit has a diagonally split casing.

Results: The latex-based paints are now being pumped at 1800 rpm without galling, shearing or separation. Use of the pump has completely eliminated paint waste due to coagulation.

Diagonally split casing of pump has proved to be a downtime reducer. The cover is easily removed for cleaning. Also, this casing design has permitted easy replacement of rotating-screw element without disturbing pipe connections.

(Positive-displacement pump is product of Goodyear Pumps, Inc., Nine Rockefeller Plaza, New York, N.Y.)

Check 3504 opposite last page.



Screw and Squeegee Pump without Stress

The pulseless pump used by Sapolin owes its success in handling shear-sensitive paints to a clever combination of the screws and squeegee principles.

As shown in diagram above, action of rotating screws is implemented by Buna-N wipers of plate wheel.

Industrial-engine coolants are periodically checked for effectiveness

Recently developed line of industrial-engine cooling-system products is supported by maintenance-service program. Products in line immediately available are 1) a full-fill cooling-system fluid consisting of ethylene glycol, deionized water and an inhibitor system, and 2) a freeze-depressant concentrate with ethylene-glycol base. An inhibitor concentrate compatible with both products is scheduled for marketing shortly.

Inspection Program

Products will be supported by maintenance-inspection program. Once a system has been filled and in operation between 12 and 14 hours, customer will send sample to manufacturer's technical-service and development department. This will be analyzed and compared with reference.

Samplings of fluid will be taken again following spring and fall. On basis of an analysis, manufacturer will recommend proper service to keep coolant at maximum effectiveness.

The full-fill product is designed to offer freeze protection to −40°F, with protection against over-heating to 240°F, engine temperature.

(Ambitrol FL (full-fill system) and Ambitrol CN (freeze-control concentrate) are products of The Dow Chemical Company, Midland, Mich.)

Check 3505 opposite last page.

NEXT MONTH

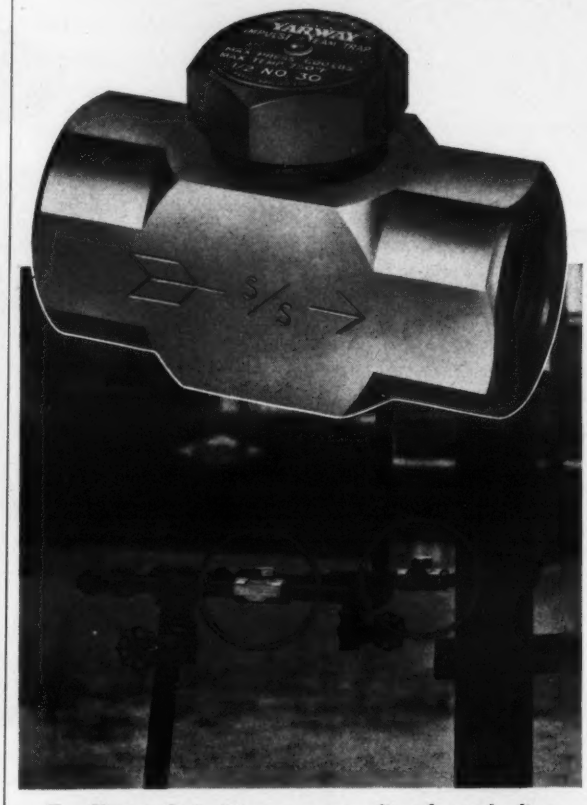
Sixteen turbine-type aerators have helped "take the bugs out" of West Virginia Pulp and Paper Company's 24-mgd waste-treatment plant at Covington, Virginia. Replacing 800 conventional impingement-type diffusers, the aerators have put an end to orifice clogging and have slashed compressor operating costs $15,000 per year. Look for the complete story in May.

YARWAY news briefs

from **Yarnall-Waring Company,** *Philadelphia 18, Pa.*

BRANCH OFFICES IN 19 UNITED STATES CITIES • SALES REPRESENTATIVES THROUGHOUT THE WORLD
STEAM TRAPS STOCKED AND SOLD BY 270 LOCAL INDUSTRIAL DISTRIBUTORS

YARWAY SERIES 30 IS THE STEAM TRAP FOR PEAK EFFICIENCY



Two Yarway Series 30 traps on tracer lines from a loading station to polystyrene storage tank at the Midland Division of The Dow Chemical Co., Midland, Mich. Steam pressure is 150 pounds.

on tracer lines, main drips, meter boxes and other steam equipment

Yarway Series 30 Impulse Steam Trap has won enthusiastic acceptance and scored outstanding success on those hundreds of applications where condensate is handled in moderate amounts. Here's why:

- Economy of operation, with closer condensate control
- Longer service life, with lever action reducing impact on valve seat
- Lower maintenance, with easily and quickly replaceable seat and disc
- High quality, all stainless steel—combined with a new low cost

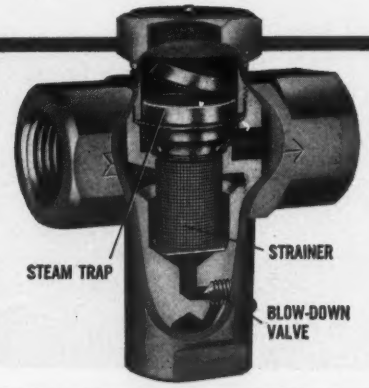
Here are a few typical user experiences:

TEXAS REFINERY—*Been using ½" No. 30's on drip legs to steam lines for 6 months. "No troubles whatsoever."*

PENNSYLVANIA TIRE MFR.—*Gradually replacing all traps on tire molds with Yarway No. 30's. "Amazed at their performance."*

MISSOURI STEEL PLANT—*Tested Yarway No. 30's against competitive traps, with result "Yarway No. 30 now standard on all main steam header drips."*

So it goes in plant after plant. Why don't *you* try Yarway Series 30 Traps? Available in ⅜" or ½" size; pressures 8 to 600 psi. Your nearby Industrial Distributor carries them. Write for his name.



NEW! COMPACT COMBINATION

NEW SERIES 130 steam trap combines a Series 30 trap, a strainer, and blow-down valve *all in one compact unit*—with these advantages:

- Saves space
- Saves weight
- Saves installation costs
- Saves on maintenance

Stainless steel construction, good for all pressures 8 to 600 psi.

Your Yarway distributor has SERIES 130 traps. Try one today—or write for new Bulletin T-1743-B.

Check 3506 opposite last page.

▸ A NEW SOLUTIONS ARTICLE

Switch of hard facing on cement-pump screws triples service life

Screw-changing downtime is greatly reduced

Problem: Average service life of pump screws was two months in plant of leading cement manufacturer. Screws are used in Fuller-Kinyon pump. They consist of seven flights or turns of nine-inch-diam helix on 14′ shaft. Screws were restored with cobalt-chromium-tungsten-alloy hard facing.

Solution: A tungsten carbide hard-facing material was utilized in rebuilding flights of cement-pump screws. Material consists of specially prepared forms of tungsten-carbide particles in selected range of sizes, packed in steel tubes to provide coating with approximate ratio of 60% carbide and 40% steel.

Surface life of rebuilt cement-pump screws was tripled when tungsten-carbide hard-facing material replaced a cobalt-chromium-tungsten-alloy hard facing. The nine-inch-diam helix is shown after rebuilding in preparation for hard surfacing

Results: Service life of screws has been upped from two-month average to six-month average duration. Also, downtime for screw changing has been greatly reduced. This means savings of two to four

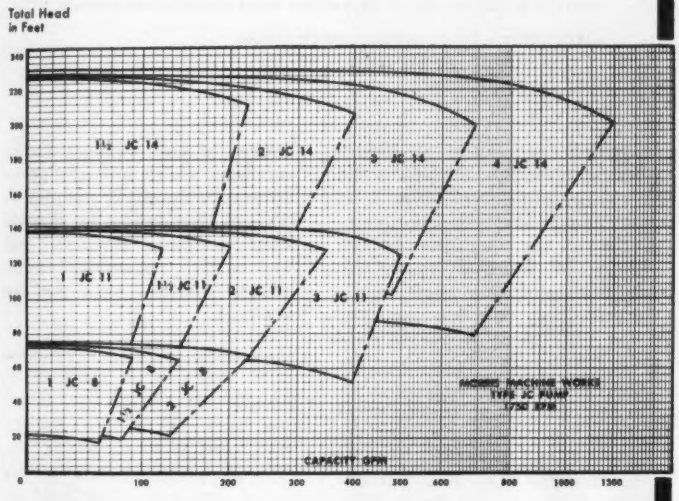
The Slurry Pump All Industry Has Been Waiting For

Especially engineered for handling abrasive slurries

Standardized for maximum interchangeability from a minimum inventory of parts

11 models—in 1", 1½", 2", 3" and 4" sizes

Only 3 bearing frames for all 11 models



The "JC" has been rigorously tested at Morris' completely-equipped slurry laboratory — first and only one of its kind in the country. Performance Curves, based on water, are shown above.

The Morris Type JC series of Slurry Pumps is a long step forward in the standardization and interchangeability of parts. The benefits of this design advance are outstanding:

- **Owner's investment in parts is drastically reduced**
- **The right part is always available from a minimum inventory**
- **Any pump can be changed over to a new application quickly, drawing parts made of the proper alloys from inventory**

The "JC" was designed specifically for process industries, with emphasis on combined abrasive and corrosive slurry handling.

Morris engineers have combined the most advanced hydraulic principles with the widest slurry-handling experience in the pump manufacturing industry.

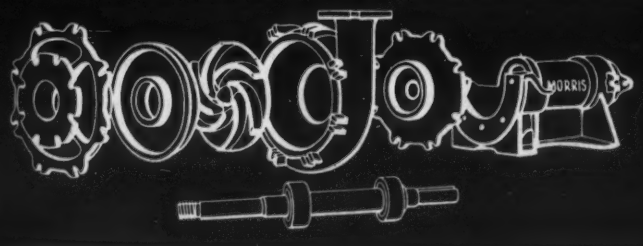
The result is a pump precisely engineered to the highly special demands of process industries.

For complete information and specifications on the outstanding capabilities of the new "JC", write to . . .

MORRIS MACHINE WORKS • Baldwinsville, N. Y.
Builders of Centrifugal Pumps Since 1864

Agents in Principal Cities

Within the Pump Sizes for Each Bearing Frame, all Wetted Parts are Interchangeable:



Frame No.	Size	Model	Impeller Min.-Max.	Size Solids
Frame #1	1	JC 8	5"— 8"	5/8"
	1	JC 11	8"—11"	5/8"
	1½	JC 8	5"— 8"	3/4"
	1½	JC 11	8"—11"	3/4"
	2	JC 8	5"— 8"	15/16"
	2	JC 11	8"—11"	15/16"
Frame #2	1½	JC 14	11"—14"	3/4"
	2	JC 14	11"—14"	15/16"
	3	JC 11	8"—11"	1 1/4"
Frame #3	3	JC 14	11"—14"	1 1/4"
	4	JC 14	10"—14"	1 5/8"

Check 3507 opposite last page.

hours of plant downtime each time a feed screw replacement is eliminated, and savings of full-day's time for hard-facing screws.

Hard-surfacing material was applied in thinner coating than that used formerly, thus reducing quantity requirements. This was accomplished by building up screw diameter with steel welding rod, then applying tungsten-carbide particles by oxy-acetylene method. Since screw loses its effectiveness with loss of 0.030 to 0.050" on outside diameter, thick wear-resistant coating was found wasteful.

(KT-80 tube Kenface is product of Kennametal, Inc., Latrobe, Pa.)

Check 3508 opposite last page.

Control positions valves automatically

An electrical-mechanical servo device has been developed which automatically positions valves, float levels, doors, hopper gates. This is done at any of several predetermined positions corresponding to control selector switch signal.

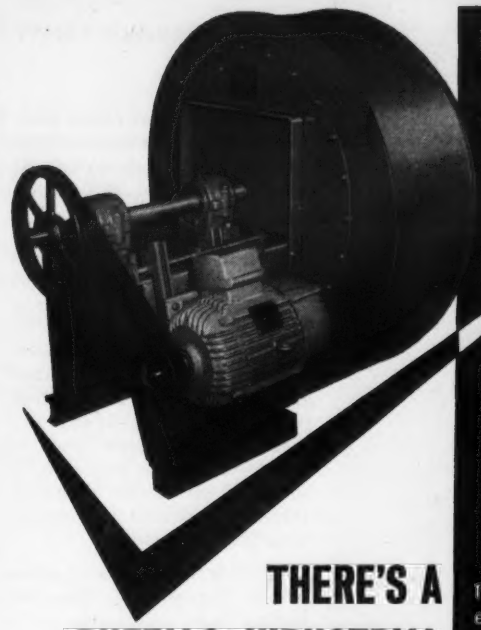
Multiple positioning control has two cam rods and connecting link at one end is attached to mechanism the positioner is controlling. Other two ends of steel cam rods trip limit switches as cam rods slide back and forth inside two channel grooves in extruded aluminum positioner housing of the unit.

There may be as many as 14 sets of switches per foot, thus 14 different positioning stops per foot in the positioner. Unit may be made in various lengths up to 8' long as standard.

Positioner achieves accuracies of plus or minus 0.005", depending upon mass and weight of load or type of application. It is not designed for extreme instrumental accuracies.

(Powr positioner PR2A is product of Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Illinois.)

Check 3509 opposite last page.



THREE SPECIALIZED WHEELS

TYPE AW AIR WHEEL for top-efficiency air, gas or fume exhausting.

TYPE MW MATERIAL WHEEL for all non-stringy materials. 6 radial blades.

TYPE OW OPEN WHEEL for stringy materials. Back plate only. Nothing to snag.

THERE'S A 'BUFFALO' INDUSTRIAL EXHAUSTER FOR ANYTHING YOU CAN MOVE THROUGH DUCTS!

These rugged all-welded steel plate exhausters are engineered with optional design best suited to specific applications! 3 specialized wheels, non-corrosive construction, high-temperature design, special materials of construction are all readily available variations from the basic Exhauster. You can have belted or direct drive; any discharge position; clockwise or counter-clockwise rotation; cleanout doors with quick-opening latches — in other words, an exhauster tailored to your exact needs, yet at standard 'Buffalo' prices. Write for Bulletin FI 110-B and select the best exhauster for your job!

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

"Buffalo"

AIR HANDLING DIVISION

BUFFALO FORGE COMPANY

Buffalo, New York

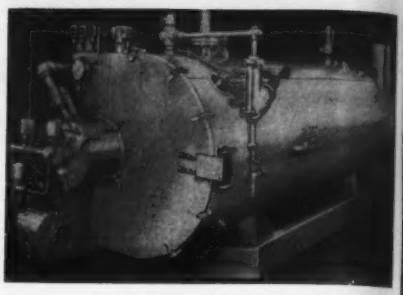
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch, and cope for production or plant maintenance.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Check 3510 opposite last page.



Hinged front cover of packaged automatic fire-tube boiler has quick-opening fasteners. It can be opened for access to heating surfaces in less than two minutes without disturbing burner, wire or pipe

Sideward shift of fire tube boosts boiler efficiency

A new design in automatic packaged fire-tube boilers permits boiler feed injection and natural thermal circulation to augment each other

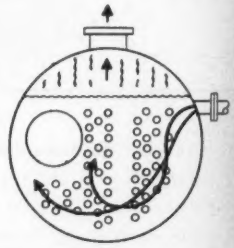
THERE are only so many ways to design an automatic packaged fire-tube boiler . . . and most of them are available to the engineer in the form of finished hardware. One heretofore untried technique—that of moving the fire tube over to the side of the boiler—is now on the market.

The designers of this boiler think that in it they have the answer to increased water-circulation and heat-utilization efficiency in steam generation (or, correspondingly, reduced operating temperatures in hot-water version of the same unit).

In the new set-up (see diagram at right), burner and furnace are located on left side of boiler's horizontal centerline. Three-pass design incorporates no tubes directly above or below furnace.

Such an approach to boiler design permits boiler feed injection and natural thermal circulation to augment each other. This provides maximum water-circulation rate. It also results in counterflow—the most efficient form of heat transfer (ie, coolest water in at coolest point and steam out at hottest point).

Bonus features of the side-mounted fire-tube arrangement include 1) elimination of danger of heat damage due to stagnant water and sludge at bottom of boiler, 2) simplification of inspection of fireside and waterside surfaces, and 3) easily accessible turn-around spaces (with positive sealing).



Positive Circulation

Circulation pattern in the packaged automatic fire-tube boiler is comparable to that in a water-tube boiler. It develops as relatively cool water is directed down through the third pass . . . following normal downward movement of natural circulation to bottom of boiler, then rising through second pass and around furnace.

This positive circulation permits boiler feed injection and natural thermal circulation to augment each other, thus providing the maximum water-circulation rate and most efficient form of heat transfer—counterflow.

Hinged front cover of the boiler has quick-opening fasteners. It can be opened for access to heating surface in less than two minutes without disturbing burner, wire or pipe. No bolts are used.

Rear boiler cover is divided. Each section is hinged with quick-opening fasteners. Cover sections form separate seal in single plane to give proctection from short-circuiting of combustion gases. This eliminates need for internal baffles.

Back construction of boiler is available with either standard dryback or optional wetback construction. Dryback design employs new type of prefired high-temperature refractory liner, backed with a lightweight insulating material. Optional wetback is interchangeable with dryback.

A combination oil-gas burner is available with the boiler. All that is needed for switch from one fuel to the other is flick of toggle switch. Oil nozzle can be left in burner; it will clean itself in on switchover.

Boilers are available in five standard sizes—50, 60, 70, 80 and 100 hp. All of these may be obtained in oil- , gas- , or combination-fired types. Hot-water and steam-atomization models are also produced in the above-mentioned five sizes.

(Positive-Flow Powermaster boilers are product of Orr & Sembower, Inc., Reading, Pa.)

Check 3511 opposite last page.

"Sealed instructions from the boss—I'm not to open them unless I goof."

Custom designed Peabody components provide efficient, safe and lower-cost operation—continuously!

As one of the oldest, most experienced manufacturers of remote interlocked burner light-off, sequence and safety control systems, Peabody offers valuable assistance in the design of your present or future boiler or process plant. A Peabody System Control includes every essential for modern, unattended automatic operation. Your nearby Peabody representative will supply details—include him in your planning by calling or writing today.

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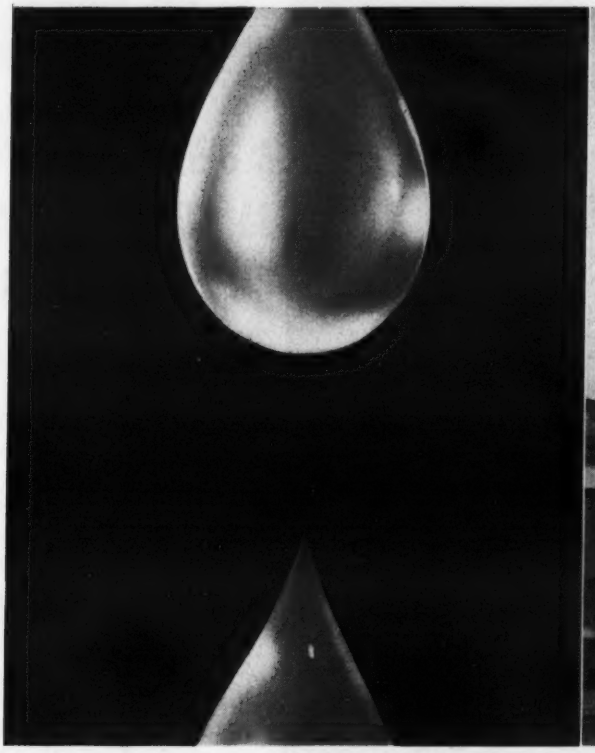
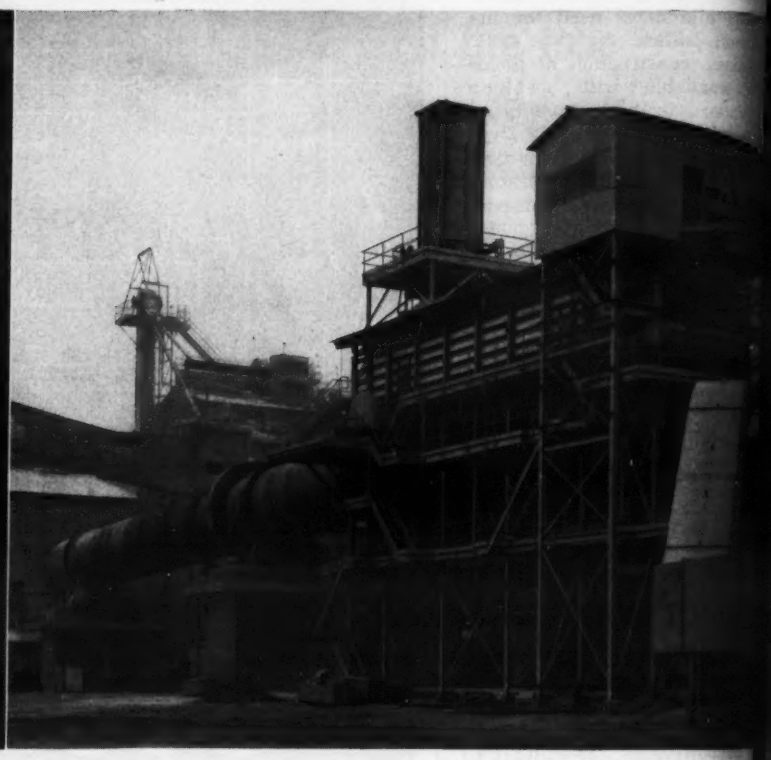
1-043

Check 3512 opposite last page.

ideas and news:





Nothing leaks in . . . or out of Electri-Cand pumps: Built without packing, stuffing box or seals, the pump-motor unit is completely fluid tight. Safely handles a wide variety of corrosive, toxic, and precious fluids without danger of contamination or loss. Liquid being pumped cools the motor, lubricates the bearings. Maintenance costs are low.

More high quality lime — less fuel: The Grate-Kiln System produces consistent high quality lime using 15% less fuel per ton of product than a conventional rotary kiln. Grate-Kiln Systems increase lime yield from limestone feed—outproduce conventional rotary kilns of the same overall length by 50%. Incorporated is a new high efficiency cooler which transfers maximum recuperated heat to secondary combustion air for kiln and preheater grate.

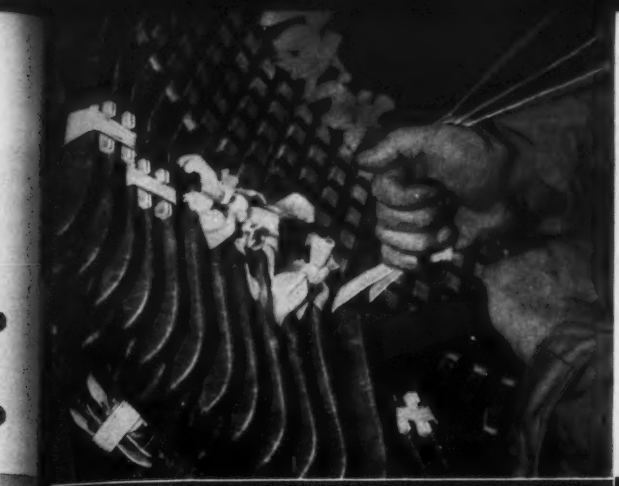
Which of these productive ideas could be working for you?

A control unit that saves space. A pump that pumps practically any solution. These examples demonstrate the extra value that is a standard with A-C . . . the greater efficiency and the added productivity which are yours when you buy A-C products, systems and services. Call your Allis-Chalmers representative for details on A-C "worth-more" features. Or write Allis-Chalmers, Industrial Equipment Division, 907 South 70th Street, Milwaukee 1, Wisconsin.

A-1404

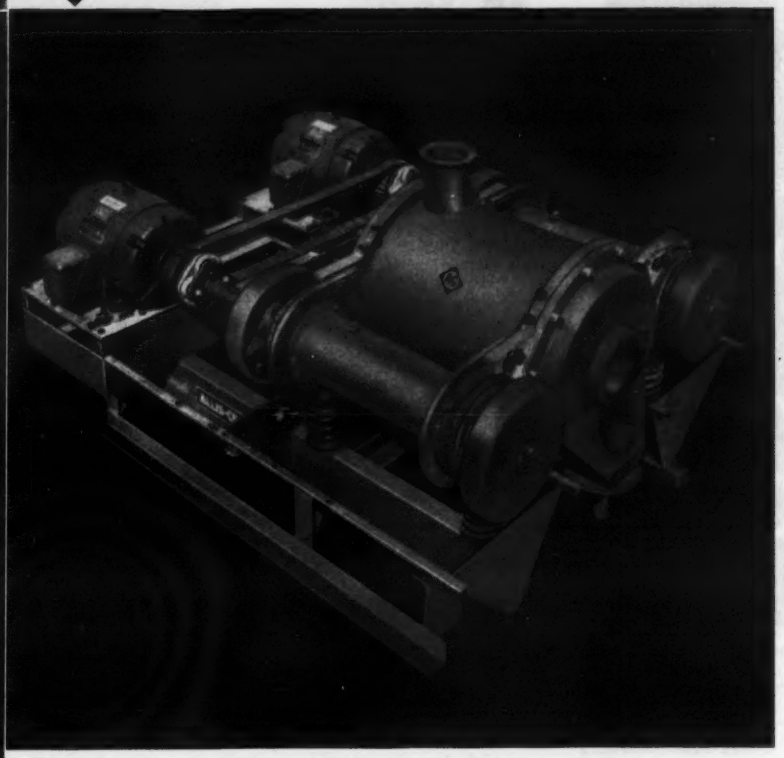
Electri-Cand, Shelter-Clad, SpaceMaker, Pyro-Shield, Silco-Flex, Grate-Kiln and Compactor are Allis-Chalmers trademarks.

Check 3513 opposite last page.



New coil insulation means fast service: Here's downtime insurance you may never need. The Silco-Flex insulation system on large Allis-Chalmers motors is so superior that coil failure is highly unlikely in ordinary service. Should failure occur, the usual 10-day rewind shouldn't be necessary. Usually eight hours is enough for the entire job of replacing the coil.

Compact, 30-inch vibrating mill: Can actually outproduce a conventional tumbling mill 15 to 30 times per unit volume . . . is powered by just two 50-hp motors. Grinding media occupy 80% of mill's 12-cu.-ft. capacity, grind wet or dry materials as fine as two microns, as coarse as 48 mesh. Adaptable to grinding in inert atmosphere, can be utilized for closed or open-circuit grinding.



So low, two fit where one used to go: This new SpaceMaker control center is the first completely new 2- to 5-kv motor controller development in more than a decade. Two-high design can cut floor space needs in half. Full drawout construction makes it the safest, most easily accessible controller available. Flame-retardent, track-resistant Super Pyro-Shield insulation adds reliability. Walk-in Shelter-Clad enclosures available for outdoors.

A-C INDUSTRIAL EQUIPMENT DIVISION: motors, control, rectifiers, pumps, compressors, crushers, grinding mills, screens, kilns, coolers, dryers, Compactor mills, industrial systems.

OTHER A-C PRODUCTS: thermal, hydro and atomic electrical generating equipment, switchgear, transformers, unit substations, tractors, earth-moving equipment, engines, lift trucks.

ALLIS-CHALMERS

Constantly imitated but never duplicated, Vogt forged steel fittings and flanges have unmatched strength and toughness for your most severe pipeline duties. Laboratory controlled materials and Vogt's special forging techniques assure products which are always uniform in structure, fine grained, and free from porosity. Thereby the shocks and stresses imposed by high pressures and high temperatures are easily withstood, and with stubborn resistance to erosion and corrosion. Consult Catalog F-10 for our complete line of fittings and flanges.

For a copy of Vogt Catalog F-10 address Dept. 24A-FCP.

HENRY VOGT MACHINE CO., P.O. BOX 1918, LOUISVILLE 1, KENTUCKY

SALES OFFICES: New York, Chicago, Cleveland, Dallas, Camden, N. J., St. Louis, Charleston, W. Va., Los Angeles

OTHER VOGT PRODUCTS

Forged Steel Valves — Petroleum Refinery and Chemical Plant Equipment — Steam Generators — Heat Exchangers — Ice Making and Refrigerating Equipment.

Vogt

DROP FORGED STEEL

Fittings and Flanges

Check 3514 opposite last page.

ENGINEERING & SAFETY

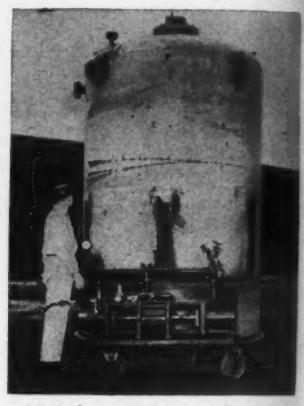
▶ A NEW SOLUTIONS ARTICLE

Pressure testing speeded by mobile pump rig

Pressure testing of process equipment is quickly accomplished by mobile hydraulic pump rig at the South Charleston, West Virginia, plant of Union Carbide Chemicals Company. Maintenance workers designed the unit.

The mobile set-up consists of horizontal air-driven hydraulic pump mounted on rubber-tired cart. Pump operates at 7330 psi on 90-psi plant air.

Rig is used for pressure-testing pipe, heat exchangers, tanks, coils and special pressure vessels after fabrication or repair. One big advantage of unit is fact that desired



Mobile air-driven hydraulic pump is used to hasten pressure testing of large-capacity vessels and other equipment at South Charleston, West Virginia, plant of Union Carbide Chemicals Company

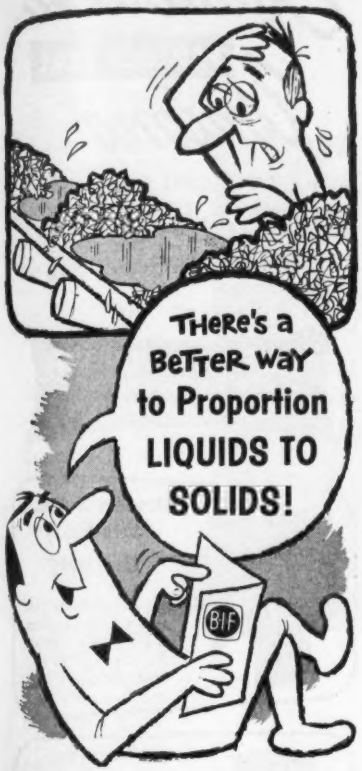
pressure is attained much more rapidly than previously, especially with large-capacity vessels. Maintenance is no problem.

(Air-driven hydraulic pump is product of Aldrich Pump Co., 30 Pine St., Allentown, Pa.)

Check 3515 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

B·I·F POSITIVE CONTROL OF MATERIALS FLOW



Does your present proportioning system suffer from short range limitations? Can one unit run empty and waste ingredients . . . spoil end product? B-I-F offers a new concept in the control of liquid to solid proportioning in the combination of its continuous dry materials weigher and its closed loop metering system. Fail-safe system — automatically stops when either unit is empty . . . prevents ingredient waste and product spoilage. Forced balance weighing principle provides wide range, greater accuracy. System governed by simple gravity flow . . . operates automatically, continuously . . . features explosion-proof construction!

Free Facts

B-I-F continuous liquids-to-solids proportioning system adapts to a wide range of applications. Spray nozzle easily applied on liquid unit. Request complete details . . . write for free facts today!

B·I·F Industries

BUILDERS-PROVIDENCE • PROPORTIONEERS • OMEGA
387 HARRIS AVENUE, PROVIDENCE 1, RHODE ISLAND

Check 3516 opposite last page.

SAFETY SLANTS

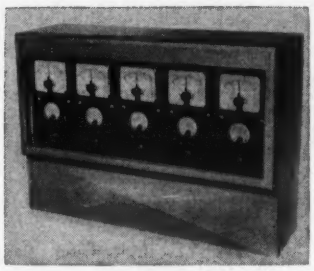
A safe direction

. . . for fumes and gases is given by use of vapor inverters which fit on storage tanks.

Inverters are available in 2, 3, 4, 6, 8, 10 and 12" sizes to fit any size of pressure-relief valve made by any manufacturer.

(Complete description of vapor inverters, including installation instructions are contained in Data Sheet 8100-37-0 — Johnston & Jennings Co., 350 5th Ave., New York 1, N.Y.)

Check 3517 opposite last page.



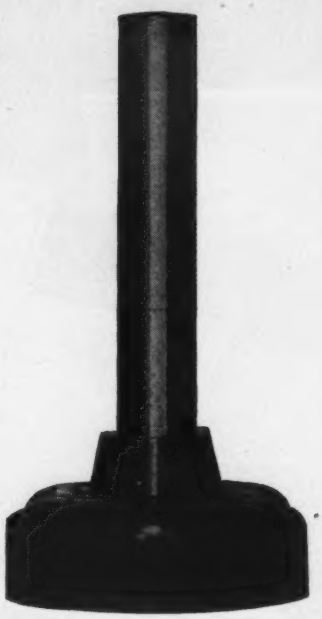
Monitor many gases

. . . by means of multi-point detection and alarm central control. Instrument monitors presence and concentration of hazardous, combustible gases at varying locations. Detection is performed by sensing elements at desired points or areas.

Each detection point has own measuring circuit, indicator and adjustable alarm. Up to five channels may be supplied for any unit which encompasses control power supply and audible alarm. Indication is read directly in terms of percent of lower explosion limit of gas.

(Multitector 520 is product of Houston Instrument Corporation, Houston 27, Tex.)

Check 3518 opposite last page.



Not easily fooled

. . . is a thermostat which automatically sorts out normal temperature changes from actual fire conditions. UL tests of this unit indicate an ability to report dangerous fire conditions minutes sooner than some devices now in use. Thermostat is used as replacement.

(Thermotec thermostat 302 is product of Tomorrow, Incorporated, 7 W. Jackson St., Hayward, Calif.)

Check 3519 opposite last page.

Stride safely

. . . without danger of slipping on floors finished with an anti-slip surface which is based on Thiokol polysulfide modified epoxy, upon which fine or coarse abrasive grains are sprinkled.

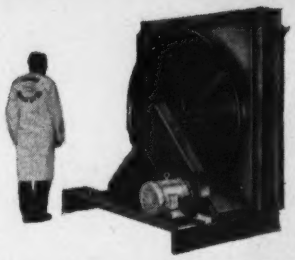
Adhesive is laid down approximately 10 mils thick. Abrasive is sprinkled on at 25 lb/100 sq ft rate.

(Ruffin surface finish is product of Custom Abrasive Products, Co., 373 W. State St., Trenton, N.J.)

Check 3520 opposite last page.

Young

BUILDS THE BEST COOLING EQUIPMENT FOR DIESEL ENGINES

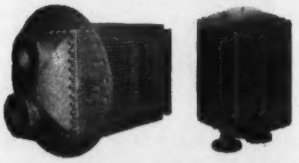


ENGINE JACKET WATER COOLERS

Horizontal air flow type—a Young industrial design. Rugged units built for heavy duty cooling and/or condensing in process or industrial service. Young Mono-Weld® construction assures longer life and trouble-free operation. Catalog No. 1356.

SHELL & TUBE HEAT EXCHANGERS

Young offers you a complete line of shell and tube, single and multi-pass, fixed and removable tube bundle units. Rugged, lightweight and compact, many models and sizes are available from stock. Fixed Tube Bundle—Catalog No. 1261. Removable Bundle—Catalog No. 1160.



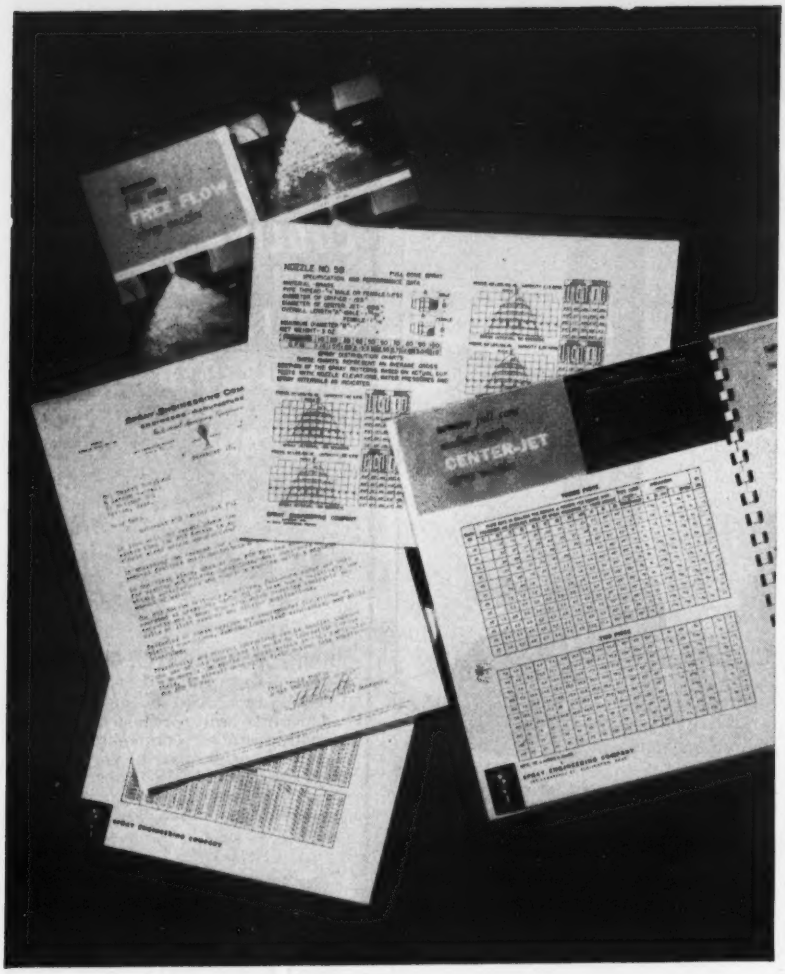
SUPERCHARGER AIR COOLERS

High and low pressure intercoolers and aftercoolers are scientifically designed and laboratory tested to provide maximum heat transfer with minimum air flow restriction. Catalog No. 1652.

Write for catalog required
Dept. D-371

YOUNG RADIATOR COMPANY
RACINE, WISCONSIN
Plants at Racine, Wis. and Mattoon, Ill.

Check 3521 opposite last page.



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Here's a surer, easier way to specify spray nozzles

How can you be sure you're specifying the *right* spray nozzle for your particular application?

Spraco's research department has taken the guesswork out of this problem by preparing complete and accurate performance data for each of the hundreds of spray nozzles in the Spraco line. Each nozzle "profile" is complete with data on material, dimensions, flow rate, pressure, angle of spray . . . everything you need to enable you to choose, at a glance, the nozzle that will deliver maximum performance and efficiency in your particular application.

No matter what your spray nozzle problem, Spraco makes this information available to you absolutely free. Why not write and ask about it — today?

SPRAY ENGINEERING COMPANY
105 Cambridge Street, Burlington, Mass.

SPRACO

Check 3522 opposite last page.

NEW LITERATURE
Plant Engineering, Safety and Fluids Handling

Flat-belt pulleys in face widths of 2½ to 12" and OD's of 4 to 36" are covered in four-page Bul 22103—T. B. Wood's Sons Co.

Check 3523 opposite last page.

Compressed-air filters, which remove liquids by coalescence and give scrubbed-and-polished treatment, are pictured in eight-page Cat 6000 — King Engineering Corporation.

Check 3524 opposite last page.

Ultrasonic-cleaning equipment is presented in 28-page catalog including an introduction to ultrasonic cleaning which explains and diagrams principles involved. Cat 60—National Ultrasonic Corp.

Check 3525 opposite last page.

Reinforced graphite and carbon felts are presented in bulletin which includes data on permeability, resistance, density, strength, and weight. Bul 104 — National Carbon Company, Division of Union Carbide Corporation.

Check 3526 opposite last page.

Low-pressure-aeration theory, techniques, equipment, and economics are considered with respect to water and sewage in 56-page Technical Reprint 56—Dorr-Oliver Incorporated.

Check 3527 opposite last page.

Drives of shaft- and flanged-mounted types are tabulated in 36-page bulletin including selection and dimensional data, engineering drawings, accessories and typical application photos. Bul 7100—The Falk Corporation.

Check 3528 opposite last page.

Safety shut off valves, supervising gas cocks, and the role they play in plant safety are detailed in 12-page bulletin. Typical safety system in a plant using fuel oil is outlined. Bul 22 — The North American Manufacturing Company.

Check 3529 opposite last page.

Floating roofs' role in cutting evaporation loss for volatile liquids in storage containers, is topic taken up in 24-page bulletin, describing features of double deck, pontoon and pan types of floating roofs, along with metallic and fabric sealing devices. Principles involved are explained in Horton Floating Roofs Bul—Chicago Bridge & Iron Company.

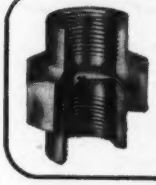
Check 3530 opposite last page.

Catawissa PERFECT SEAL Unions

HOT FORGED from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

A TYPE FOR EVERY USE!
FOR ALL PRESSURES!
FOR ALL TEMPERATURES!

Standard & Double Extra Heavy UNIONS
Available with screwed or socket weld ends. 3000-lb. sizes ⅛" to 3"; 6000-lb. sizes ⅛" to 2".



GASKETLESS CUP-ORIFICE UNIONS
Choice of stainless or carbon steel cup-type plate. 3000-lb. service.

MALE & FEMALE UNIONS
With steel-to-steel, bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.

FULL STAINLESS & FULL ALLOY STEEL UNIONS
With screwed or socket weld ends. 3000-lb. and 8000-lb. service.

Write for Catalog 60
Showing the Complete Catawissa line of Perfect Seal Products

CATAWISSA VALVE & FITTINGS COMPANY
CATAWISSA, PENNA.

Check 3531 opposite last page.

THAT'S INTERESTING

Right but wrong

Rainmakers have been correct in seeding clouds with silver iodide to cause precipitation, but their reason for doing it is wrong.

At least that is the finding of Dr. L.F. Mondolfo and Dr. B.E. Sundquist at Illinois Institute of Technology.

Before water floating in the atmosphere can precipitate, it must be changed into ice. Scientists have generally felt that since silver iodide's crystal structure is similar to ice, it formed a good nucleus around which solidifying ice could form.

Mondolfo and Sundquist contend silver iodide serves as a good nucleus because its surface energy is higher than ice, not because of similar crystal structure.

In short, the material with the lower surface energy forms a coating around that with the higher surface energy.

"We need valves for rugged, continuous operation."

"We need valves that will reduce maintenance and replacement costs."

"We need valves for our severe high temperature-pressure applications."

The answer to all 3 is OIC

FORGED STEEL VALVES

Key men . . . responsible for maintaining continuous production with minimum downtime . . . know the importance of valve performance!

That's why OIC, with years of experience in the chemical and petroleum industries, developed a complete line of forged steel valves for rugged service in high temperature-pressure applications.

Available for operation on all lines up to 2-inches, OIC forged steel valves are designed to meet your control requirements with minimum replacement and maintenance cost. Consult your local OIC distributor today. He can help you select the exact valve you need.

Available with trims to service most applications, and with socket weld, flange and screwed end connections.

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THE OHIO INJECTOR COMPANY
261 Main Street, Wadsworth, Ohio

Please send me more information about FORGED STEEL VALVES

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City _____ Zone ____ State _____

Check 3532 opposite last page.

Answers to hose line problems of

FLEXING
HEAT
PRESSURE

Aeroquip Hose of Teflon and Reusable ***"super gem"*** *Fittings**

Where flexing, heat and pressure are problems, Aeroquip Hose of Teflon and Reusable ***"super gem"*** Fittings provide answers. Aeroquip Hose of Teflon, lightweight and flexible, has long service life even under constant flexing, and with steam temperatures to 388 degrees and pressure up to 1500 psi. Contact your local Aeroquip distributor. *Write for full information:* Bulletin IEB-50.

*U. S. Patent Nos. 2,833,567 and 2,731,279. ***"super gem"*** is an Aeroquip Trademark. Teflon is DuPont's trade name for its tetrafluorethylene resin.

Aeroquip

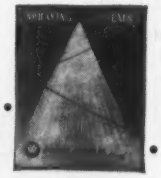
Aeroquip Corporation, Jackson, Michigan
Industrial Division, Van Wert, Ohio
Western Division, Burbank, Calif.
Aeroquip (Canada) Ltd.
Toronto 19, Ontario
AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

Check 3533 opposite last page.

got a **SPRAY NOZZLE** *problem?*

perhaps one of our **DATA SHEETS** *can suggest a solution*

For almost every spraying application, there's a Spraying Systems Data Sheet that gives useful information on suggested installations and types of nozzles to use. If you have a problem, write and let us know the application involved . . . and we'll send the Data Sheet that applies.



SPRAYING SYSTEMS CO.
3216 RANDOLPH STREET • BELLWOOD, ILLINOIS

And . . . for complete spray nozzle information, write for Catalog 24.

Check 3534 opposite last page.

ENGINEERING & SAFETY

Emergency generating sets are outlined in 12-page bulletin including data-selection tables, giving various cycle, phase and volt characteristics. Bul 2900—Electrical Division, Fairbanks, Morse & Co.

Check 3535 opposite last page.

Acetylene manufacturing, distribution, storage, safe handling, application, and engineering data are reviewed in 12-page bulletin published by Liquid Carbonic, Division of General Dynamics.

Check 3536 opposite last page.

Aluminum high-heat paint is taken up in three-page bulletin describing how paint can be used for many applications sometimes thought "unpaintable." Bul 1206—Speco, Inc.

Check 3537 opposite last page.

Variable speed drive applications, including special controls and principles of operation, are shown in eight-page bulletin. Bul 551—Graham Transmissions, Inc.

Check 3538 opposite last page.

High-pressure packaged-compressor systems incorporate balanced-opposed design and have cylinders for pressures to 10,000 psig. They are subject of Bul 189—Clark Bros. Co., Division of Dresser Industries, Inc.

Check 3539 opposite last page.

Accident-prevention programs and how they can be sold to employees are illustrated in 12-page, four-color cartoon pamphlet that includes some straight-from-the-shoulder talk about how employees benefit from taking an active part in a safety program. Further information on "The Big Payoff" is available from — National Safety Council.

Check 3540 opposite last page.

Magnetic disc brakes are taken-up in eight page Bul 605-B—Stearns Electric Corporation.

Check 3541 opposite last page.

Single-stage, double-suction centrifugal pumps are subject of bulletin which includes specifications, interchangeability chart, performance curves and dimensions. Bul 721.6 — Goulds Pumps, Inc.

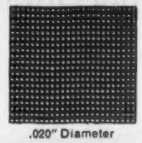
Check 3542 opposite last page.

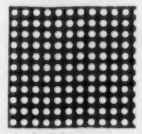
Electric-heater bands, air-heating elements, mineral-insulated heating cable and special radiant heaters for process and comfort heating are all reviewed in Catalog Supplement CS-600 — Edwin L. Weigand Company.

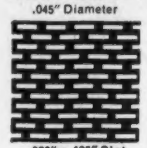
Check 3543 opposite last page.

H&K Perforated Screens

for Grading Sieving Dewatering Filtering Straining • Sterilizing and Tote Baskets


.020" Diameter


.045" Diameter


.028" x .125" Slot

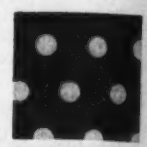
FIND NEAREST H&K AGENT IN THE 'Yellow Pages'

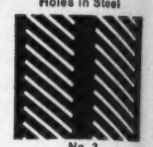
Listed Under "Perforated Metals"

H&K perforated screens are furnished, to customer order, with holes accurate and uniform in size, shape and spacing. The screen resists blinding as burr-free holes are slightly larger at the bottom. H&K perforated screens can be furnished with margins or unperforated areas in practically any material desired.

H&K specializes in the perforating of stainless steel, monel and other corrosion-resistant alloys.

Contact either H&K office or an H&K agent. Let us work with you on your perforated screen requirements.


Tapered Round Holes in Steel


No. 3 Diagonal Slot

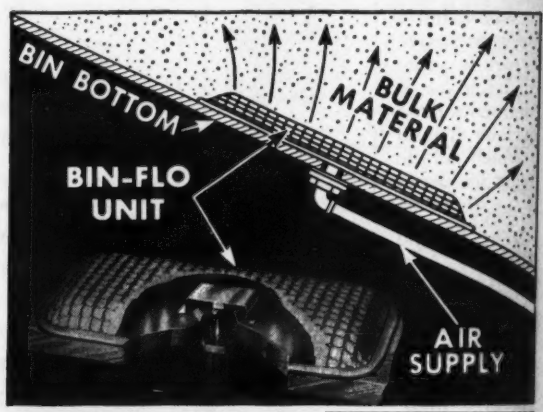
Write for H & K General Catalog

THE Harrington & King PERFORATING CO. INC.

Chicago Office and Warehouse
5636 Fillmore St., Chicago 44, Ill.

New York Office and Warehouse
110 Liberty St., New York, N.Y.

Check 3544 opposite last page.



BIN-FLO USES SMALL VOLUME OF AIR AT LOW PRESSURE

KEEPS BULK MATERIALS MOVING

BIN-FLO units in bins, chutes, hoppers, etc., restore flow characteristics to dry, finely ground materials which tend to pack or bridge in storage. Types for all materials and conditions. No moving parts; simple installation; negligible operating cost; no maintenance cost.

BIN-DICATOR the original diaphragm-type bin level indicator. In successful use for over 20 years. **ROTO-BIN-DICATOR** new, motor-driven paddle type; excellent on bins under pressure or vacuum, and for general application. Also explosion-proof units, U.L. listed.

THE BIN-DICATOR CO.
13946-D Kercheval • Detroit 15, Mich.

Write for detailed literature or call
VAlley 2-6952

WE SELL DIRECT • PHONE ORDERS COLLECT

Check 3545 opposite last page.

Solar sail feasible

Performance of Echo I, the balloon satellite, is inflating the hopes of proponents of the solar sail.

This is the idea, advanced by Dr. Richard L. Garwin of Columbia U., that a space vehicle could be propelled by a sail made of extremely thin plastic film coated with vaporized aluminum which could catch the pressure of sunlight reflected against the shiny surface in much the same way that sailboats use the wind.

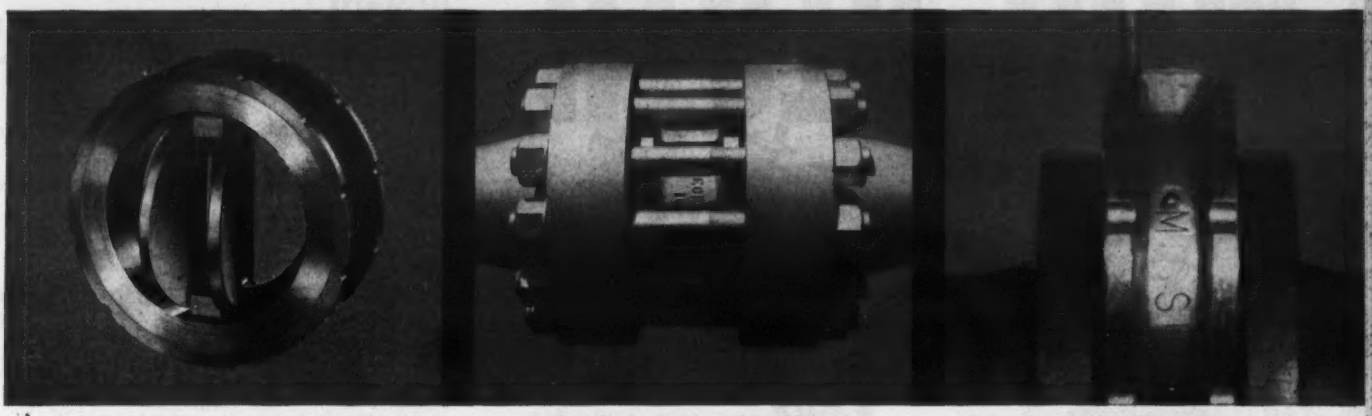
Echo I, made of the same material and in orbit since August is drifting away from its natural orbit due to pressure of solar radiation.

Industrial R & D up

Chemical and allied industries spent $928 million for research and development in 1959 to rank third behind aircraft ($2973 million) and electrical equipment and communication ($2227 million).

Total private R & D spending was $9.4 billion, 15% up over 1958.

COSTS LESS—WEIGHS LESS—EASY TO INSTALL

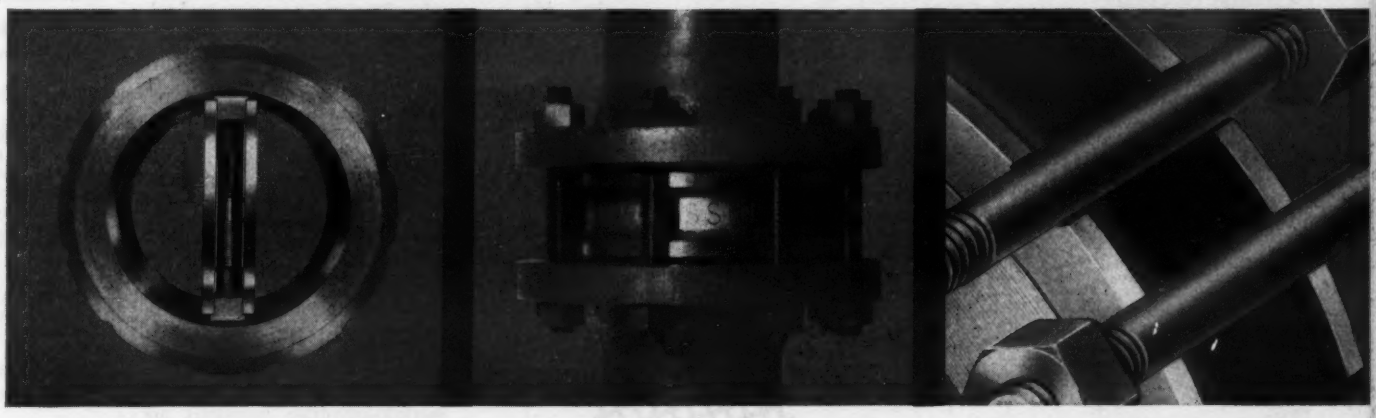


Because of its sound, imaginative design, the Duo-Chek check valve is smaller, uses less material, and costs less to buy. It costs less to maintain and lasts longer, too.

A Duo-Chek check valve weighs on the average less than ten per cent, with some models weighing only two per cent, as much as conventional check valves for the same service. No foundations are needed.

The Duo-Chek fits between the flanges, is smaller and weighs less. For example, a 6-inch steel valve, series 300, weighs 29 lbs., requires no special installation equipment.

NO SLAM—ANY POSITION—CUTS INVENTORY



A stainless steel coil spring effects positive sealing action. The quick action of the spring closes the valve before reverse flow can occur. Result: No slam, no water hammer.

The Duo-Chek simplifies piping arrangements. The spring loaded plates operate in any position. Most popular sizes can be installed even in vertical lines with downward flow.

The unique versatility of the Duo-Chek greatly reduces inventory. In sizes 2 through 12 inch, one valve fits both series 150 and 300 flanges; 2- and 3-inch sizes fit series 600, too.

MISSION **DUO-CHEK** CHECK VALVE

The Mission Duo-Chek® check valve performs all regular check valve duties, yet is smaller, lighter, and easier to install. Duo-Chek check valves are available in a complete range of sizes from 2 to 48 inches, ASA Series 125 through 2500. They come in various end connections, such as raised face, ring joint, weld neck, etc. They are made in carbon steel, stainless steel, aluminum, and bronze. Special alloys are available. Because of the small size of the Duo-Chek, special alloy valves cost much less than conventional valves in the same alloy.

Sealing material is bonded in a groove in the plate. The sealing material makes an O-ring seal, which pressure deforms until metal-to-metal contact is made by the plate and body seat. Sealing material may be Buna-N, Teflon, Viton, or metal, depending on the service.

The simplicity of design of the Duo-Chek pays off in every installation with longer life and less maintenance. Only six parts are contained within the body of the Duo-Chek, held without the use of internal fasteners or joints of any kind. All parts are interchangeable.

The Duo-Chek is much lighter in weight than conventional check valves, yet is stronger. By dividing the opening, the unsupported plate area is reduced so that each plate requires only one-eighth of the weight of a conventional clapper of the same strength. The short stocky body is inherently stronger and more rigid than a short length of heavy wall pipe.

Whatever your check valve application, the Mission Duo-Chek can cut initial purchase and installation costs, cut maintenance costs from then on. Contact Mission now for a representative.

MISSION VALVE AND PUMP CO. A SUBSIDIARY OF MISSION MANUFACTURING CO. P. O. Box 4209, Houston, Texas • Cable Address 'MISSCO' • Export Office: 30 Rockefeller Plaza, New York • In the United Kingdom: MISSION MANUFACTURING CO., LTD., 1 Hanover Square, London W. 1 England • Cable Address 'MISSOMAN' • Sold by Mission Manufacturing Company outside of Canada and the U.S.A.

MISSION VALVE AND PUMP CO.

Check 3547 opposite last page.

WIRE CLOTH

for

FILTERING

SIZING

STRAINING

TESTING

In all metals, in all weaves ... woven to the highest accuracy standard in the industry. You just can't buy a better wire cloth than "NEWARK." Hundreds of meshes, weaves and metals to fit *your* specific need. Years of processing experience to help you pick the right wire cloth for *your* application. Write for Bulletin FC or write us about your problem. Fast deliveries, best cloth, lowest cost when you call on NEWARK.

NEWARK for ACCURACY

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381 VERONA AVENUE • NEWARK 4, N. J.

Check 3548 opposite last page.

manufacturers' current literature

This section features a variety of literature currently available from manufacturers. See also the other sections in this issue for new literature pertaining to those particular sections

Chemical Materials

Hydrogen-peroxide information is available in published form from Becco Chemical Division, Food Machinery & Chemical Corporation.

Check 3549 opposite last page.

A miticide which gives beef cattle, hogs, goats, and sheep protection from ticks and other insect pests is reviewed in Delnav Bul—Hercules Powder Company, Incorporated.

Check 3550 opposite last page.

Polypropylene properties are tabulated in Pro-Fax Bul—Hercules Powder Company.

Check 3551 opposite last page.

Adsorption with activated carbon is subject of Activated Carbon Bul—Activated Carbon Division, Pittsburgh Chemical Company, Subsidiary of Pittsburgh Coke & Chemical Co.

Check 3552 opposite last page.

Succinic-anhydride properties are outlined in Bul I-11—National Aniline Division, Allied Chemical Corporation.

Check 3553 opposite last page.

Formaldehyde, from stabilized formalin with low-temperature tolerance 20° below ordinary standards to water-free trioxane, is considered in Formaldehyde Bul—Celanese Chemical Company, Division of Celanese Corporation of America.

Check 3554 opposite last page.

Caustic soda, caustic potash and carbonate of potash are among alkalies covered in bulletin available from Hooker Chemical Corporation.

Check 3555 opposite last page.

Silicone coatings for paper are discussed in brochure, "How Silicones Serve the CPI"—Dow Corning Corporation.

Check 3556 opposite last page.

Polyvinylidene chloride latex has moisture-vapor transmission 2-½ to 5 times lower than that of polyethylene. Its properties are expanded upon in Resyn 3600 Bul—National Starch and Chemical Corporation.

Check 3557 opposite last page.

Silicone defoamers are discussed in Foam Control Manual—Dow Corning Corporation.

Check 3558 opposite last page.

Processing Equipment

Plastic Pall rings, are injection-molded in four sizes—⅝, 1, 1½ and 2"—in polypropylene (and PVC or polystyrene on special order). They are covered in Plastic Pall Rings Bul—Process Equipment Division, U.S. Stoneware.

Check 3559 opposite last page.

Rotary water-tube coolers are specified in bulletin published by Davenport Machine and Foundry Company, Division of Middle States Corporation.

Check 3560 opposite last page.

Jet-vacuum refrigeration is used in many plants in capacities varying from few to 4500 tons. Full story on this technique is contained in Chill-Vactor Bul—Croll-Reynolds Co., Inc.

Check 3561 opposite last page.

Boiler feed-water deaeration is topic of Bul 575—Fred H. Schaub Engineering Company.

Check 3562 opposite last page.

Automatic continuous ion exchanger is subject of bulletin put out by Illinois Water Treatment Co.

Check 3563 opposite last page.

Pulp tanks, in capacities of 500 to 2000 gal and storage tanks in capacities of 100 to 5000 gal, are reviewed in two bulletins available from Lee Metal Products Company, Inc.

Check 3564 opposite last page.

CURRENT LITERATURE

Kettles, of 2/3-jacketed, 5- to 500 gal; 2/3-jacketed, 80- to 300-gal; center-line scraper-agitator, 80- to 300-gal; full-jacketed, 10- to 300-gal; 2/3-jacketed, 40- to 200-gal; and 2/3-jacketed, 5- to 100-gal types, are considered in A, CW, CW3T, B, Pressure, and C Kettle Buls—Lee Metal Products Company, Inc.

Check 3565 opposite last page.

Steel-belt coolers are reviewed in bulletin published by Steel Belt Conveyor Department, Sandvik Steel, Inc.

Check 3566 opposite last page.

Processing equipment, including staged mixing equipment, is subject of Buls T-11 and T-1159—Process Equipment Division—Turbo Mixers, General American Transportation Company.

Check 3567 opposite last page.

Tanks of all types and sizes are subject of Fabrication Cat—Kirk & Blum Manufacturing Co.

Check 3568 opposite last page.

Reactors and tanks with dimple-jacket design are available from Brighton Corporation.

Check 3569 opposite last page.

Vacuum pans and quick-cooling pans are available in capacities of 10 to 500 gal and 50 to 200 gal, respectively. They are subjects of two bulletins published by Lee Metal Products Company, Inc.

Check 3570 opposite last page.

Crystallizers for cooling, evaporation and reaction are considered in DTB Crystallizers Bul—Swenson Division, Whiting Corporation.

Check 3571 opposite last page.

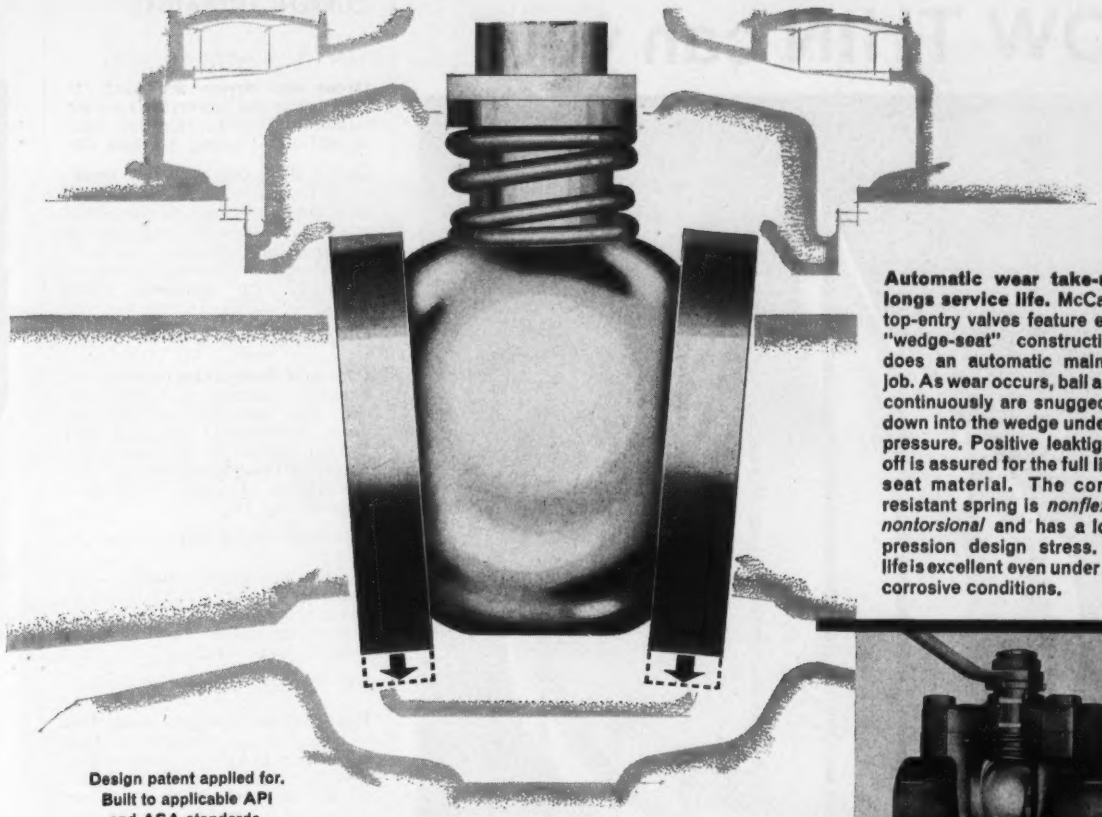
Drying and Heating

Fired heat exchangers operate on oil or gas to produce temperatures to 1900 F, flows to 500 lbs/sec, and pressures to 5000 psig. They are delineated in Bul 113—Thermal Research & Engineering Corp.

Check 3572 opposite last page.

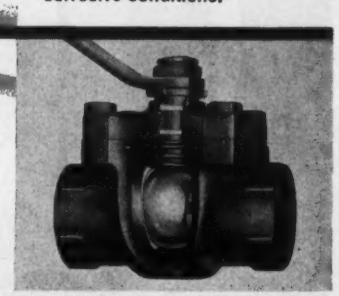
Kilns, for variety of applications including coke calcining, are subject of bulletin published by Kennedy Van Saun Manufacturing & Engineering Corporation.

Check 3573 opposite last page.



Design patent applied for. Built to applicable API and ASA standards.

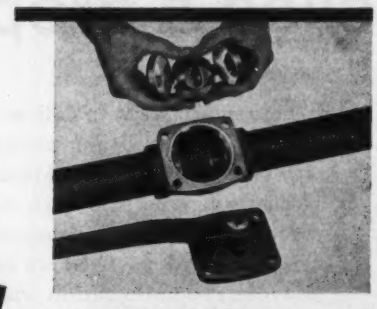
Automatic wear take-up prolongs service life. McCannaseal top-entry valves feature exclusive "wedge-seat" construction that does an automatic maintenance job. As wear occurs, ball and seats continuously are snugged further down into the wedge under spring pressure. Positive leaktight shut-off is assured for the full life of the seat material. The corrosion-resistant spring is *nonflexing* and *nontorsional* and has a low-compression design stress. Service life is excellent even under severely corrosive conditions.



Fast quarter-turn operation from full-open to full-close. Screwed, flanged, or socket weld connections 2" to 8" sizes.

McCannaseal® Top-Entry Ball Valves

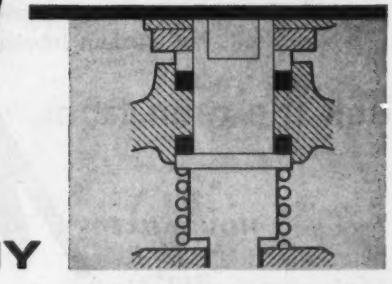
. . . the valves with "wedge-seat" design that automatically adjusts for wear



In-line maintenance. Simply remove ball and seats, reassemble with new seats, and you're back in business in minutes.

New catalog gives complete data all types Hills-McCanna ball valves, for pressures to 1000 psi, temperatures to 600° F, manual or motor-operated. Includes dimensions, materials, C_V values, corrosion-resistance data—everything required for selection and piping layouts. Send for your copy today.

*A complete line of ball valves, ¼" through 12" sizes for liquids, gases, vacuum . . . including models with high-temperature and fire-safe seats.



Leaktight stem seal. Double seals are under compression at all times—and the higher the line pressure, the tighter the seal.

HILLS-McCANNA COMPANY

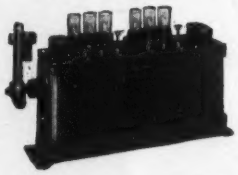
BV61-2 4600 WEST TOUHY AVENUE, CHICAGO 46, ILLINOIS

Check 3574 opposite last page.

HOW THIN can you

slice a drop of oil?

Whether you want to deliver several drops or the minutest fraction of a drop per piston stroke, a Manzel lubricator will do the job exactly. Manzel lubricators force oil of any viscosity against the high steam, gas and air pressure so common in modern compressors, engines and machines. They start, stop, speed up or slow down in synchronization with your equipment. Write for our catalog explaining the whole line. Manzel, 251 Babcock Street, Buffalo 10, New York. For efficient lubrication



ask the man from

A UNIT OF HOUDAILLE INDUSTRIES, INC.

Manzel

SPECIALISTS IN LUBRICATORS AND METERING PUMPS SINCE 1898

Check 3575 opposite last page.

CURRENT LITERATURE

Ovens and dryers are made in both batch and conveyor types for service to 1000°F. They are topic of Bul 157—Young Brothers Co.

Check 3576 opposite last page.

Dehydrator, designed to command-regenerative heatless principle, is covered in six-page brochure available from Electro-Mechanical Division, Lear Industrial Products.

Check 3577 opposite last page.

Cage-mill flash-drying system disintegrates material to normal particle size and simultaneously reduces moisture to specified final content. Details of set-up are presented in Flash-drying System Bul —Raymond Division, Combustion Engineering, Inc.

Check 3578 opposite last page.

Permanent-magnetic pulleys are available in 192 sizes to 36" diam in any belt width. Line is tabulated in Permanent-magnetic Pulleys Bul —Eriez Manufacturing Co.

Check 3579 opposite last page.

Heat-recovery systems and kiln installations are presented in Buls TKB-3 and 1115, respectively—Traylor Engineering & Manufacturing, Division of Fuller Company, Subsidiary of General American Transportation Corporation.

Check 3580 opposite last page.

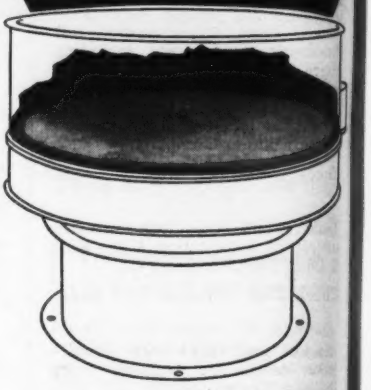
Blated heat exchanger of type used successfully by manufacturer of petroleum jelly, is subject of Thermutator Bul—Cherry-Burrell Corporation.

Check 3581 opposite last page.

"Mathematical genius—hmph! He can't even remember such figures as 36-22-35."

Henry Gaines Goodman, Union Carbide Chemicals

CONSIDER THESE FACTS about REAL RE-SCREENING ECONOMY



1—Rescreening your used rings costs less than buying new rings.

2—Buying SOLID RINGS which can be re-screened MOST often saves MOST dollars in the long run.

MULTI-METAL OFFERS REAL ECONOMY by

1—Re-covering New "Non-Returnable" Rings—or

2—Recovering Old Solid Rings—or

3—Furnishing New Solid Rings good for many re-screenings

Whichever you choose, let Multi-Metal help you cut replacement costs.

MM MULTI-METAL WIRE CLOTH CO., INC.

1356 GARRISON AVENUE, NEW YORK 59, N.Y.

Check 3582 opposite last page.

CURRENT LITERATURE

Plate-type heat-exchanger coil is specified in Bul P54—Platecoil Division, Tranter Manufacturing, Inc.

Check 3583 opposite last page.

Rotary dryers, are explained in Bul 118—The C. O. Bartlett & Snow Co.

Check 3584 opposite last page.

Titanium heat-exchanger tube, is among types discussed in Heat-exchanger Tube Bul—Wolverine Tube, Division of Calumet & Hecla, Inc.

Check 3585 opposite last page.

Separation and Size Reduction

Micronizers grind and classify in one operation in single chamber to provide fines in range of ½ to 44 microns. Units, which can handle heat-sensitive materials, are considered in Micronizing Bul—Sturtevant Mill Company.

Check 3586 opposite last page.

Vibrating screens are produced in slurry, dry, electrically heated and washing versions in sizes to two-ft wide and six-ft long. They are considered in Vibrating Screens Bul—Derrick Manufacturing Co.

Check 3587 opposite last page.

Sanitary screeners are expanded upon in bulletin published by The Orville Simpson Co.

Check 3588 opposite last page.

Conejectors apply three continuous dynamic forces—separating, filtering and metering—to material being processed. They are available in four sizes and are explained in Bul 1287—The Sharples Corporation.

Check 3589 opposite last page.

Corrosion Control

Fiber-glass duct fans are available in 17 models in sizes of 14 to 42" for capacities to 32,500 cfm. They are reviewed in Bul 175—Aerovent Fan Company, Inc.

Check 3590 opposite last page.

Corrosion-resistant fittings for light-wall Schedules 5 and 10 Stainless-steel pipe are subject of catalog available from Horace T. Potts Company.

Check 3591 opposite last page.

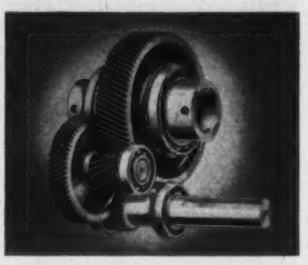
... the quality-engineered package

that simplifies speed reduction

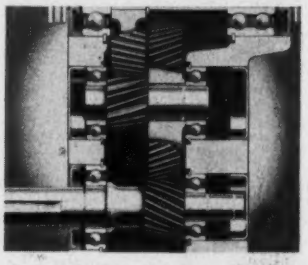
DODGE TORQUE-ARM, America's most widely used shaft mounted speed reducer, will save money for *you.* No foundation, no sliding motor base, no flexible coupling, no installation fuss. Developed and perfected by Dodge, this reducer has been so widely accepted in industry that it is now built and stocked in this unmatched range of sizes and models: capacities up to 170 hp; output speeds from 10 to 400 rpm; ratios of 5:1, 15:1, 25:1; speed ratios up to 175 to 1 with correct selection of speed reducer and V-belt drive. Built-in backstop available. Also positive overload release. Vertical models. Flange mounted models. Special application models . . . Go modern—go Torque-Arm! See your Dodge Distributor, or write us.

Dodge Manufacturing Corporation, 6200 Union St., Mishawaka, Ind.

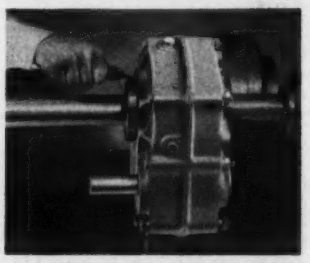
Rugged, semisteel housing holds bearing seats in line for entire life of unit. Laughs at loads. Corrosion resistant.



AGMA rated helical gears. Soft cores withstand shock; hardened surfaces defy wear. Teeth are crown shaved.



Gears are located *between* bearings and carry their loads without strain. Longer life, higher efficiency.



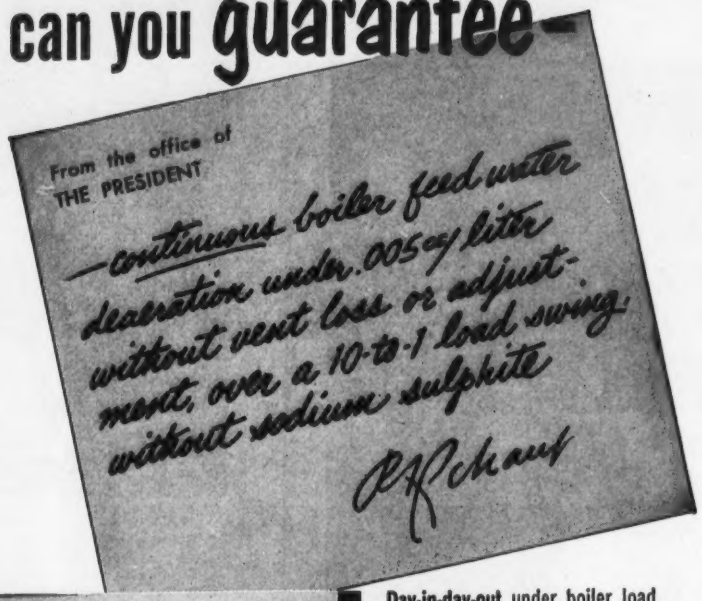
Unit slides completely onto shaft and locks on *both* sides of housing. This baby stays *put*—runs truer longer.

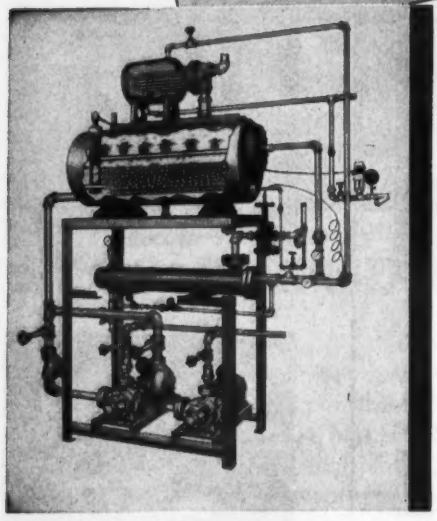
The Products with the Pluses... **DODGE** *of Mishawaka, Ind.*

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge he can give you valuable assistance on new cost-saving methods.

Check 3592 opposite last page.

ONLY with SCHAUB can you guarantee—


From the office of
THE PRESIDENT
—continuous boiler feed water deaeration under .005 cc/liter without vent loss or adjustment, over a 10-to-1 load swing without sodium sulphite
A. F. Schaub



Day-in-day-out under boiler load swings as great as 10-to-1—**not** just under favorable fixed test conditions.

Excellent thermal efficiency (insignificant steam vent loss) under **all** regular operating conditions – with no vent adjustment for any load change.

No need for sodium sulphite or other additives. (If you need 'em, you just aren't getting full mechanical deaeration).

Plus at least 6 other savings in operations, maintenance and installation.

All are the result of the unique, but 15-year proved, Schaub design for external superheating, explosive flashdown and fully-vented operation.

SCHAUB ZERO-OXYGEN deaerators

GET THE FULL FACTS -- SEE YOUR SCHAUB REPRESENTATIVE OR SEND FOR BULLETIN 575. EITHER WAY YOU WILL PROBABLY CHANGE YOUR IDEAS ON WHAT CONSTITUTES TRUE DEAERATION OF BOILER FEED WATER.

FRED H. SCHAUB ENGINEERING COMPANY
5312 Belmont Road, Downers Grove, Ill.

CLIP AND ATTACH TO YOUR LETTERHEAD

Please send my personal copy of Bulletin 575

Name_____

Check 3593 opposite last page.

CURRENT LITERATURE

Square-braided Teflon packings of various styles are available in all sizes in standard 1/16" increments from ⅛ to ¾" square. Complete information is contained in Bul CP-552—Chemical & Power Products, Inc.

Check 3594 opposite last page.

Stainless-steel gate valves are delineated in bulletin put out by The Wm. Powell Company.

Check 3595 opposite last page.

Teflon expansion joints, of type which has been proved out in high-temperature service on vapor connection in vacuum-drying operation used in making dyes, is considered in Teflon Expansion Joints Bul—Packing Division, Raybestos-Manhattan, Inc.

Check 3596 opposite last page.

Rubber hose for corrosive applications is reviewed in bulletin available from Manhattan Rubber Division, Raybestos-Manhattan, Inc.

Check 3597 opposite last page.

Rubber-coated fans for corrosive applications are among models considered in Bul FD11—Fly Ash Arrestor Corporation.

Check 3598 opposite last page.

Fume fans are available with rubber welded to all metal parts for service in corrosive applications. They are further detailed in Buls 2424-F and FI-511—Air Handling Division, Buffalo Forge Company.

Check 3599 opposite last page.

Report which demonstrates that steel pipe line with Teflon is comparable in installed cost with 316 stainless steel is available from Resistoflex Corporation.

Check 3600 opposite last page.

Sealless plastic pumps are available in capacities to 40 gpm for discharge pressures of 40 psi and services in temperature range of −60 to +350°F. Other facts are presented in Booklet 10A—Vanton Pump & Equipment Corp., Division of Cooper Alloy Corporation.

Check 3601 opposite last page.

Processing-equipment line, is tabulated in bulletin of Processing Equipment Division, Struthers Wells Corporation.

Check 3602 opposite last page.

Pyrex-glass-pipe role in corrosive applications is considered in Bul PE-3—Corning Glass Works.

Check 3603 opposite last page.

"This computer has to be primed . . ."

Mark Larkin, Electra Mfg. Co.

Thermoplastic tube resists concentrated HCl to boiling point and withstands saline solutions at temperatures over 212°F. It is listed in Thermoplastic Tube Bul—Imperial-Eastman.

Check 3604 opposite last page.

Throttlable plastic gate valves are available in Penton, PVC and styrene copolymer. Socket-weld, screwed and flanged versions may be obtained in ½ to 2" sizes for services to 150 psi. Line is delineated in Cat 42A—Vanton Pump & Equipment Corp., Division of Cooper Alloy Corp.

Check 3605 opposite last page.

Process Instrumentation

Pneumatic and electronic recorders are available in standard accuracies to within 0.5% and optional accuracies of 0.25%. They are covered in Buls 98286 and 98335, respectively—Taylor Instrument Companies.

Check 3606 opposite last page.

Portable pH meters are AC-line operated. Industrial model is direct-reading, continuous-indicating type. Additional information is incorporated in pH Meters Bul—Cambridge Instrument Company, Inc.

Check 3607 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Metering pumps for sulfuric acid and other strong oxidizing agents forces liquid through Hypalon tube by way of wave-like action of steel fingers which never contact metal. It is presented in Metering Pump T6SH Bul—Sigmamotor Inc.

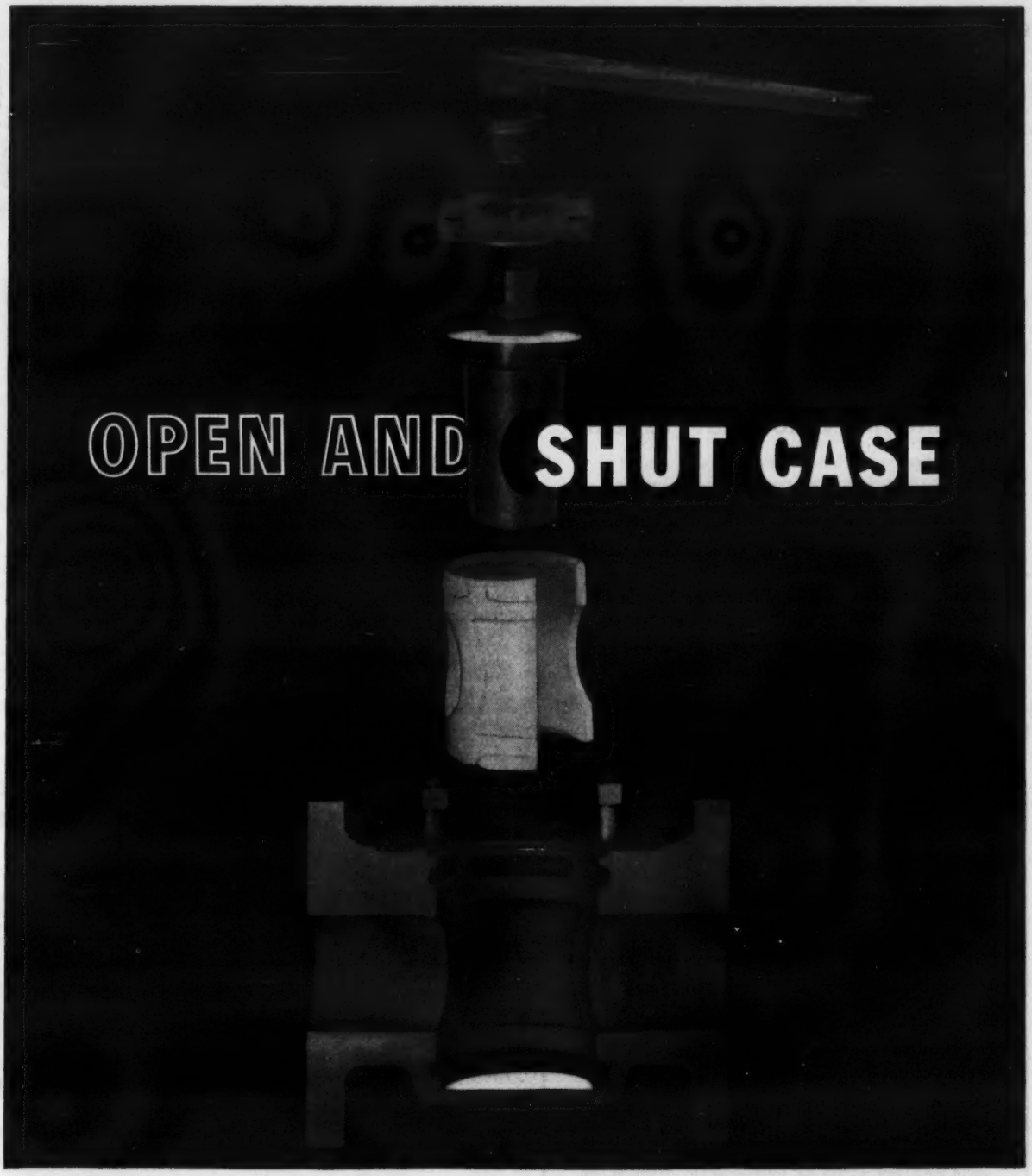
Check 3608 opposite last page.

High-pressure gages of all types are tabulated in catalog available from Strahman Valves, Incorporated.

Check 3609 opposite last page.

Gages have Bourdon tubes available in four materials—bronze, steel, stainless steel and K Monel. Complete selection and accessories for various services are considered in Cat DH-65—Helicoid Gage Division, American Chain & Cable Company, Inc.

Check 3610 opposite last page.



Leakproof sealing without maintenance in ON-OFF service makes an open and shut case for specifying Continental's TUFLINE nonlubricated plug valves. ■ For the facts of the case, examine closely the special high pressure sealing ribs and carefully sculptured body bore configuration. This, combined with the specially tempered pure Teflon* sleeve and tapered plug, is where Tufline valves pay off... in bubble-tight sealing without plug adjustment even under fluctuating temperature conditions. ■ For complete information on Tufline valves ¼" through 10", 150# and 300# class, 2-way through 5-way, or jacketed, furnished in a wide range of metals for services from light hard-to-hold gases to heavy corrosive slurries, temperatures—150°F. to +400°F., high vacuum to 615 psi (depending on temperature), write Continental Mfg. Co., 230 Park Ave., N.Y. 17, N.Y. ■ *Registered trademark of E. I. Dupont de Nemours & Co., Inc.

TUFLINE
PLUG VALVES

CONTINENTAL MANUFACTURING COMPANY • CINCINNATI 42, OHIO

Check 3611 opposite last page.

DELAVAN CARBIDE SPRAY DRYING NOZZLES LAST LONGER

Tungsten carbide orifice plus patented swirl chamber combine to give you a longer lasting, better performing nozzle. Flow rates and spray angles are certified – your assurance of performance as rated. For full facts on the Delavan SDX (illustrated) and others, write for Catalog SD-1 and SD-2.

DELAVAN Manufacturing Company
WEST DES MOINES, IOWA

Check 3612 opposite last page.

For Greatest Savings in Pumps Get a Dean Brothers GS

Here is the pump that put *service* back into pumps. And with Dean Brothers exclusive service parts policy, no worry about down time waiting for obsolete replacement parts... there are no such things. One day delivery. Consult yellow pages for nearest representative, or wire, phone or TWX direct for fast dependable service.

Type GS Standard Centrifugal Pumps
For general, industrial and chemical service
Capacity: to 300 gpm @ 1750 rpm—to 600 gpm @ 3500 rpm
Head: 20 to 80 ft @ 1750 rpm —80 to 300 ft @ 3500 rpm
Pumping Temperature: —150° F to plus 350° F
Working Pressure: to 180 psig @ 350° F

For Full Information Ask for Circular 190

DEAN BROTHERS PUMPS INC.
INDIANAPOLIS 7, INDIANA
The Best Is Our Standard

Check 3613 opposite last page.

CURRENT LITERATURE

Dial thermometers of rigid-stem, wall-mounted and flush-mounted styles, each have full 4½" dial face. They are presented in Dial Thermometers Bul—Palmer Thermometers, Inc.

Check 3614 opposite last page.

Temperature recorders, controllers, indicators, control systems and accessories are depicted in four-page Bul COM—West Instrument Corporation.

Check 3615 opposite last page.

Liquid-level gages have liquid chambers made in one piece from solid bars of carbon or alloy steel, and precision heat-treated, machined and ground. Additional description of these gages is contained in Liquid-level Gages Bul —Penberthy Manufacturing Company, Division of Buffalo-Eclipse Corporation.

Check 3616 opposite last page.

Diaphragm control valves are taken up in a bulletin published by Kieley & Mueller, Incorporated.

Check 3617 opposite last page.

Multi-point temperature controller handles 10 process temperatures. Scanner scanning rate is three sec per point on unit which is detailed in Instrument Section 52-5 —Thermo Electric Co.

Check 3618 opposite last page.

Precision pumping of small amounts of liquid is discussed in Bul 1257-1—Milton Roy Company.

Check 3619 opposite last page.

WANTED: NOMOGRAPHS — WORTH $20 EACH!

Do you have a pet nomograph that could save time for other CHEMICAL PROCESSING readers? If so, send it neatly and accurately drawn, with a double spaced, typewritten description to:

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We will pay $20 for each one accepted and published.

NOW! HIGH FREQUENCY

IN A JUNIOR SIZE...AT A JUNIOR PRICE!

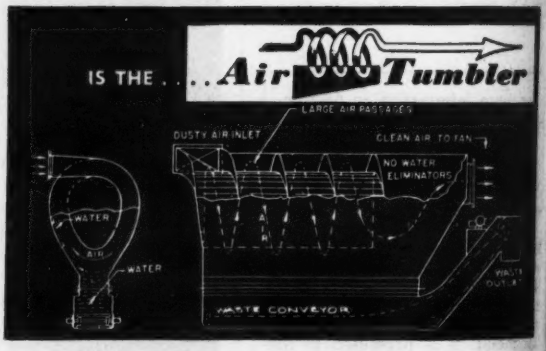
AVAILABLE in SLURRY SCREENS • DRY SCREENS with dust enclosures • ELECTRICALLY HEATED SCREENS • WASHING SCREENS • Sizes up to 2 feet wide and 6 feet long. Steel or stainless steel construction.
UNIFORM — high speed centrifugal action produces maximum efficiency, minimum blinding.
EFFECTIVE RANGE — 2 to 325 mesh wet or dry.
RUGGED — totally enclosed vibrating motor, contamination-free . . . no exposed moving parts . . . low power requirements.

WRITE FOR DETAILED LITERATURE

DERRICK MANUFACTURING CO.
592 DUKE RD. BUFFALO 25, N. Y. Phone NT 3-9010

Check 3620 opposite last page.

The MASTER of DUST in INDUSTRY



THE WET COLLECTOR THAT BECOMES STANDARD EQUIPMENT WHEREVER TRIED BECAUSE IT DOES A BETTER JOB AT LESS COST.

More than one million CFM in ONE plant

Write for Bulletin No. 601 Address

DUST SUPPRESSION & ENGINEERING CO.
P. O. BOX 67 • LAKE ORION, MICHIGAN

Check 3621 opposite last page.

Infrared analyzers are presented in bulletin available from Instrument Division, Mine Safety Appliances Company.

Check 3622 opposite last page.

Proportioning pumps have metering accuracy to within ±1% when operating between 10 and 100% of capacity. Featuring interchangeable liquid ends, they are reviewed in Proportioning Pumps Bul—Pump Division, American Meter Company Incorporated.

Check 3623 opposite last page.

Annunciators and accessories are presented in bulletin published by Scam Instrument Corp.

Check 3624 opposite last page.

Bin-level indicators of various types are depicted in bulletin published by The Bin-Dicator Co.

Check 3625 opposite last page.

Closed-circuit-television applications in industry are discussed in bulletin published by Kintel, Division of Cohu Electronics, Inc.

Check 3626 opposite last page.

Filtration and Dust Collection

Scrubber, which handles small dust and fume particles which do not exceed 1/25,000" in size, are topic of Bul W-8560—The Ducon Company, Inc.

Check 3627 opposite last page.

Rotary drum filters are specified in bulletin available from Goslin-Birmingham Manufacturing Co., Inc.

Check 3628 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

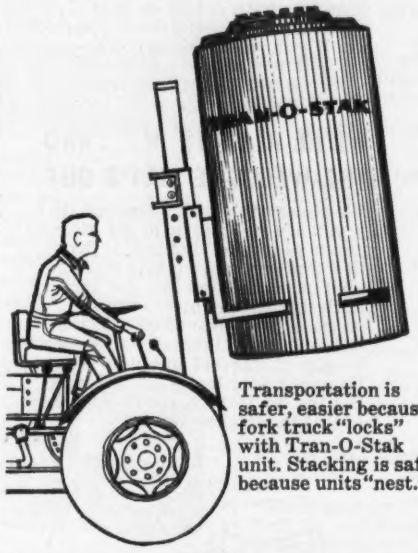
Dust collectors of cloth-tube type are reviewed in Bul 372 D—Wheelabrator Corporation.

Check 3629 opposite last page.

Filter which sluices with lid on incorporates solid jet stream moving back and forth across face of each leaf in one design. Units are further detailed in Bul EF-2a—Enzinger Division, The Duriron Co.

Check 3630 opposite last page.

an entirely new concept in TRANSPORTING and STACKING drummed material

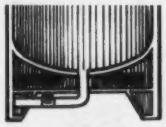


The advent of Tran-O-Stak not only introduces new concepts in handling drummed material, but also eliminates several disadvantages inherent in 55-gallon drums.

Available in 4-, 5-, and 6-drum capacities and intermediate sizes, it utilizes a cleanly cylindrical interior plus discharge through dished or cone bottom to handle any flowable material including liquids, semi-liquids, powders and crystals. Write today for complete information.

Transportation is safer, easier because fork truck "locks" with Tran-O-Stak unit. Stacking is safe because units "nest."

Tran-O-Stak is moved from any angle without chance of damage to container. No pallets are used. Fork slots totally enclose fork, protecting valve, piping and bottom head.



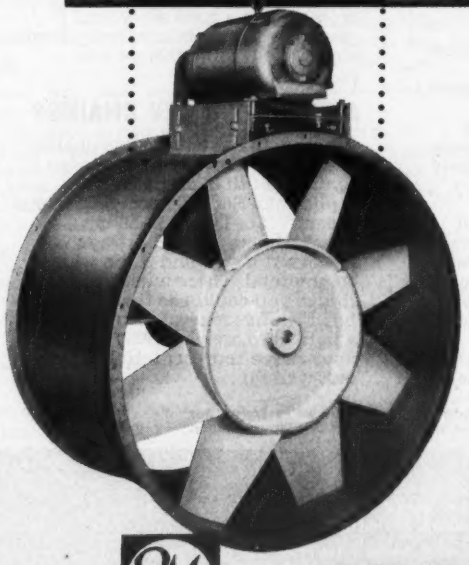
Flush sides allow complete draining, eliminating compatability problems or contamination. Rugged construction protects lining or coating indefinitely.

Manhole allows interior inspection, cleaning. Also permits insertion of device for positive agitation before emptying.

TRAN-O-STAK DIVISION | ADVANCE BOILER & TANK CO. | 1711 S. Carferry Dr. | Milwaukee 7, Wis.

Check 3631 opposite last page.

CHANGE MOTORS ..ANYTIME TO STEP UP CAPACITY!



BELT-DRIVEN AXIAL FANS

PROPELLAIR Type BT Fans, sizes through 60", have universal mounting plates which accommodate motors to 30 HP. All bearing assemblies are sized for 50 HP loads. BT Fans can easily be field-modified to boost or decrease capacity, regardless of original rating, simply by changing the motor and V-belt drive. Use BT Fans for low-cost general duty, for handling corrosive or explosive fumes, extreme heat or high humidity. Straight-line design permits easy, inexpensive installation. A wide range of propeller designs permits selection for maximum efficiency at the operating range involved. Fans bear AMCA Certified Ratings to 84,000 cfm, free air. Write today for Bulletin 625CP.

PROPELLAIR, Div. of Robbins & Myers, Inc., Springfield, Ohio.

DIRECT CONNECTED · SKY-BLAST® · EXTENDED SHAFT · MAN COOLER · AMCA

R&M PROPELLAIR®

Check 3632 opposite last page.

ONE OF A SERIES OF CHATS ABOUT CONSERVATION AND CONTROL OF HEAT

SARCO TOPICS

A FAMOUS FLUID WITH TEMPERATURE CONTROL PROBLEMS

Wine has never been properly appreciated by enough people. Many think you simply press grapes, bottle the juice, and wait a while to create wine. Even those who pride themselves on their knowledge of this age-old drink are seldom aware of the artful thermal engineering required. Pasteurizing wine is actually one of the most tricky and delicate feats in the field of liquid processing.

Take temperatures. Wine must be pasteurized at 140°F. Those are the facts of life in the world of wine. They might not seem too difficult to live with unless you're in the wine or chemical processing business.

Take New York's Monarch Wine Company, producers of Manischewitz Wine. Their Problem: how to maintain the 140° temperature in the heat exchangers despite wide variations in the rate of wine flow. These variations, between 5 to 60 gallons per minute, result from slowdowns and recoveries in the bottling process. Problem: entire system must be capable of complete shutdown when necessary. Problem: wine temperatures must be raised to 140° as rapidly as possible, sometimes an immediate jump of 100°

Attracted perhaps by aspects of the situation that had little to do with pure science, Sarco engineers applied the collective experience of Sarco technology to the solution of this serious problem. The result for Monarch: the *degree of control* the process demanded—achieved through the excellent use of Sarco Temperature-Pressure Regulators, Float Thermostatic Steam Traps, Thermo-Dynamic Steam Traps, and Pipeline Strainers.

Sarco engineers, ever resourceful, divided each of the two large Cherry-Burrell plate-type heat exchanger units into two separate sections with a blank baffle plate, each with a separate Sarco control. Thermal sensing bulbs were installed in wine discharge and throttling controls hooked into steam supply. As demand fluctuates, one or both regulators function to maintain the 140° temperature.

In higher demand, both regulators are operative; as demand drops and flow decreases, only one regulator supplies steam. Pasteur himself would have been elated.

Each of six smaller capacity shell-and-tube heat exchangers required only one regulator, with the sensing bulb inserted into the outlet side of the wine filled shell, and the regulator throttling steam supply to the tube section. Thus, by controlling flow of steam to the exchangers on the basis of pressure and temperature, the Sarco regulators were able to maintain the temperature of the wine at precisely 140° regardless of fluctuations in demand or supply rate. Whew! A lot of engineering went into those two sentences.

From here on it's downhill. To secure complete cut off of the steam supply during scheduled shut-downs of the bottling run, solenoid valves were provided to supplement normal modulating action of the controls. To discharge widely varying loads of condensate continuously and remove immediately all air and incondensible gases, Sarco Float Thermostatic Steam Traps were installed on all condensate outlets. On the drips before each control valve a Sarco Thermo-Dynamic Steam Trap was installed to insure delivery of dry steam. Sarco Pipeline Strainers were installed before all steam traps and valves to protect them against damage by any foreign bodies. And thus ends a classic story of the grape.

Still, this story has been condensed far too much, really, and we feel you've been cheated out of the story's more delicious details. You needn't be, however. We've printed the facts in detail for posterity and you in Sarco Case History 185, complete with drawings that practically make it a do-it-yourself kit. If you would like a copy, we will be flattered to receive your request, and dispatch it with dispatch.

WE'RE ALWAYS IN . . . AND THE WELCOME MAT'S OUT

We always take it for granted that if you are going to be in the vicinity of our plant you'll phone or drop us a line so we can invite you to visit us. You'll find that our factory in Bethlehem, Pennsylvania, is on many well-travelled routes and that our steam laboratory has much to offer in interest and helpfulness. Forgive us for being immodest, but the lab is the most up-to-date of its kind in the country.

When you visit us, don't allow yourself to get sidetracked by the drill presses and automatic lathes. We're proud of this equipment but you've probably seen metal mutilated before, and it's our steam laboratory that's unique. We promise you a good show, and if you have any problems, bring them along. We'll solve them while you wait.

ANYONE FOR KEY CHAINS?

We seem to have these key chains. Want one? They're much more convenient than a case. A tiny replica of a Sarco Thermo-Dynamic Steam Trap, Type TD-50 is attached, but you can always remove it if you find it too commercial. There must be many things you could use these chains for. Fishing sinkers? Lengthening a light cord, maybe? Anyway, if your Sarco representative is out, write in.

Pardon our monopolizing the conversation in this series of paid communiques, but we're trying our best to interest you in certain subjects that concern us both—to the point where you'll communicate.

6354

SARCO

SARCO COMPANY, INC.
635 MADISON AVENUE NEW YORK 22, N. Y.
PLANT: BETHLEHEM, PA.
STEAM TRAPS • TEMPERATURE CONTROLLERS
STRAINERS • HEATING SPECIALTIES

Check 3633 opposite last page.

CURRENT LITERATURE

Plant Engineering

Temperature-indicating paints are available in 36 types covering temperature range of 40 to 1350°C. They are reviewed and depicted in DetectoTemp Bul—Princeton Division, Curtiss-Wright.

Check 3634 opposite last page.

Wire cloth is treated in 120-page catalog published by the Cambridge Wire Cloth Company.

Check 3635 opposite last page.

Waste-collection trucks are considered in Dinosaur and Dinomaster Bul—Dempster Brothers Inc.

Check 3636 opposite last page.

Rotary positive blowers have capacities of 30 to 4000 cfm, for pressures to 15 psig (single) and 75 psig (multi-stage). They are specified in Rotary Blowers Bul—M-D Blowers, Inc., Subsidiary of Miehle-Goss-Dexter, Inc.

Check 3637 opposite last page.

Belt-driven axial fans are produced in sizes through 60" and have universal mounting plates which accommodate motors to 30 hp. They are specified in Bul 625CP —Propellair, Division of Robbins & Meyers, Inc.

Check 3638 opposite last page.

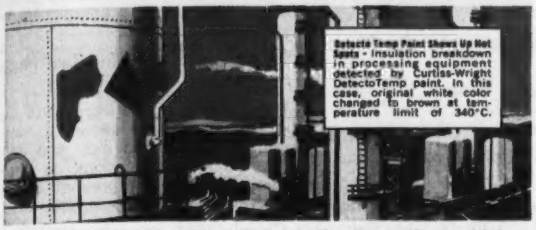
Heavy duty pipe cutters are available in five sizes for ⅛ to 6" applications. They are tabulated in Pipe Cutter Bul—The Ridge Tool Company.

Check 3639 opposite last page.

"Claims he can make your corrosion problems disappear!"

Bill Hays, Union Oil Co.

Color-Changing Paint Indicates Temperatures — Thermal Distribution


Detecto Temp Paint Shows Up Hot Spots - Insulation breakdown in processing equipment detected by Curtiss-Wright DetectoTemp paint. In this case, original white color changed to brown at temperature limit of 340°C.

Detectotemps are temperature indicating paints which change from one color to a totally different color when certain temperatures are reached. They are used in hundreds of operations from chemical processing, petroleum refining to welding, forging, heat treating and monitoring surface temperatures to improve quality, reduce costs or increase safety. Detecto Temp has the unique ability to indicate local temperature variations. This is impossible to do with thermocouples or any other presently available product. Colorful folder available.

DETECTOTEMP
Paint available in 4 oz. and 1 lb. metal cans. 36 types cover temperature range from 40°C to 1350°C

Thermochrom
Crayons convenient for testing surface temperatures of small areas. 18 crayons cover temperature range from 65°C to 670°C.

CURTISS WRIGHT
Princeton Division • Princeton, New Jersey
Also available through AIRCO Distributors

Check 3640 opposite last page.

Babbitt *Adjustable* **SPROCKET RIM**
with Chain Guide
CHANGES THAT DANGER ZONE TO A SAFETY ZONE

— enables you to ADD PLANT AREA

If re-aligning equipment will yield more working space, better production, lower costs —do it NOW. Save all space wasted for placing ladders to reach overhead valves. At the same time, convert Danger Zones to Safety Zones. Equip every overhead valve wheel in your plant with Babbitt Adjustable Sprocket Rims with Chain Guides.

- They simplify pipe layout.
- They fit any size valve wheel.
- They are easy to install and operate.
- They operate any valve from the floor.
- They save time and money.
- The first cost is the only cost (no maintenance).
- They are packed completely assembled (one to a carton), with easy-to-follow instructions.
- A hot-galvanized rust proof chain is available for all sizes.

Babbitt Adjustable Sprocket Rims with Chain Guide are carried in stock by most mill supply houses. Just phone your mill supply salesman, or contact us direct.

Babbitt STEAM SPECIALTY CO.
14 BABBITT SQUARE, NEW BEDFORD, MASS., U.S.A.

Check 3641 opposite last page.

CURRENT LITERATURE

Aluminum gratings are available with serrated or plain bars in all sizes to meet practically every requirement. Specifications are outlined in Bul A759—Grating Division, Rockwell-Standard Corporation.

Check 3642 opposite last page.

Blasting grit is presented in four-page Black Beauty Bul—H. B. Reed & Company, Inc.

Check 3643 opposite last page.

Pre-engineered buildings and their applications are considered in Buildings Bul—Butler Manufacturing Company.

Check 3644 opposite last page.

Plastic coating which can be applied like plaster with trowel or brush, is produced in 1- and 5-gal cans and 55 gal drums. Further information on product is contained in No-Drip-Bul—Mortell Company.

Check 3645 opposite last page.

Liquid-gas separation is subject of bulletin presenting unit utilizing basic principles of capillary physics and surface chemistry to protect air, gas and steam systems and pneumatically operated instruments and mechanisms from effects of entrained water, oil, water-oil emulsions and dirt. Bul 102 —Selas Flotronics, Division of Selas Corporation of America.

Check 3646 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Wire cloth in hundreds of meshes, weaves and metals is topic of Bul FC—Newark Wire Cloth Company.

Check 3647 opposite last page.

Wire cloth is considered in bulletin available from The W. S. Tyler Company.

Check 3648 opposite last page.

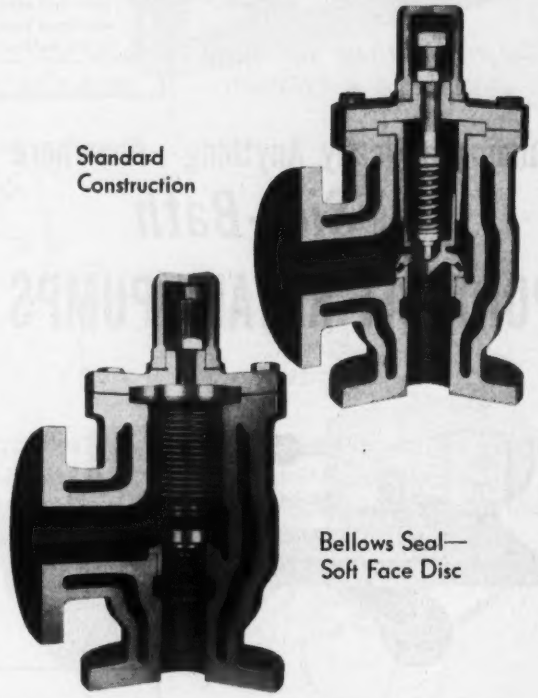
Enclosed starters may be ordered completely wired and mounted on racks built to specifications. Units are discussed in Spin Top Enclosures Bul—Square D Company.

Check 3649 opposite last page.

Re-screening used rings is discussed in Re-screening Bul—Multi-Metal Wire Cloth Co., Inc.

Check 3650 opposite last page.

Jacketed RELIEF VALVES



Designed especially for heavy viscous products such as asphalt, waxes, plastics, heavy oils and pitches, this valve is fully jacketed for maximum heating efficiency. The disc is of top guided design, removing all flow interferences inherent in bottom guided types. Gasketed cap covering adjusting screw provides zero leakage.

Valve seats may be removed or repaired without removing valve from line.

Standard valves in stock are semi-steel with iron trim in 2″ x 3″ and 3″ x 4″ sizes rated @ 450°F or 150# steam maximum jacket pressure. Set pressures range from 5–125#.

Steel and stainless steel bodies and trim, Teflon faced disc available on order.

Catalog and Prices sent on request

Parks-Cramer Company
PROCESS HEATING DEPARTMENT
FITCHBURG 12, MASSACHUSETTS

Check 3651 opposite last page.

Take the Pump to the Job!

External gear and bearing type GEAREX pump, coupled with speed reducer to gasoline engine and mounted on portable skid-type base for oil gathering in the field.

Pump practically Anything -- Anywhere with *Sier-Bath* PORTABLE ROTARY PUMPS

External jacketed GEAREX pump, mounted on fifth-wheel type portable dolly, has 5-hp. gear shift motor drive and push-button starter. Delivers 75 to 15 gpm. of heavy oil base material with viscosities from 10,000 to 300 SSU at temperatures of 120° to 160°F., discharging against 25 to 35 psig. with flooded suction.

- Motor-driven or engine-driven
- Skid-mounted or dolly-mounted
- Wide range of gear and screw pumps to handle materials at
  - —volumes from 1 to 2,600 gpm.
  - —viscosities from 32 to 5,000,000 SSU
  - —pressures to 1,000 psig.

When you need a portable pump for field service—for remote locations—for auxiliary or standby service around the plant, you can have the outstanding performance of Sier-Bath Rotary Pumps with the exact construction, capacity and portable mounting to suit your needs.

Sier-Bath Rotary Pumps handle a wide range of materials whether lubricating or non-lubricating, thick or thin, hot or cold, corrosive or non-corrosive. Compact and rugged—smooth, pulseless discharge—years of dependable pumping with negligible maintenance and repair.

Send us details of any portable pump requirements or discuss your needs with the Sier-Bath representative listed in your "Yellow Pages". Write for catalogs showing all Sier-Bath Rotary Pumps.

Sier-Bath GEAR & PUMP CO., Inc.
9260 Hudson Blvd., North Bergen, N. J.
Founded 1905 Member A.G.M.A.

Sier-Bath ROTARY PUMPS

Check 3652 opposite last page.

CURRENT LITERATURE

Copper-base-alloy chemical-processing-equipment applications are reviewed in bulletin available from Ampco Metal, Inc.

Check 3653 opposite last page.

Tube-expansion control is subject of Bul 64—Airetool Manufacturing Company.

Check 3654 opposite last page.

Carbon dioxide, and its applications are taken up in CO_2 Bul—Chemicals Division, Olin Mathieson Chemical Corporation.

Check 3655 opposite last page.

Fans, each incorporating air-cooled shaft, are expanded upon in Bul 960—Garden City Fan & Blower Co.

Check 3656 opposite last page.

Packaged hydraulic systems, are considered in Bul 15802—Vickers Incorporated, Division of Sperry Rand Corporation.

Check 3657 opposite last page.

Dye penentrant for inspection is available in spray cans. Additional specifications are included in Spotcheck Bul—Magnaflux Corp.

Check 3658 opposite last page.

Valves

Ball-valve design incorporates tapered cartridge, which may be taken out by removal of retaining nut. Designed for services to 800 psi and temperatures of −40 to +400°F, they are presented in Ball Valves Folder—Crane Co.

Check 3659 opposite last page.

Lubricated plug valves are available for services in temperature range of −150 to +450°F from high vacuum to 615 psi (depending upon temperature). They are specified in Teflon Plug Valves Bul—Continental Manufacturing Company.

Check 3660 opposite last page.

Pressure-loss tests, check valves, and cause, effect and control of water hammer are taken up, respectively, in Buls 659, 654 and 851—The Williams Gauge Co., Inc.

Check 3661 opposite last page.

Needle throttling valves are taken up in bulletin available from Marsh Instrument Company, Division of Colorado Oil and Gas Corporation.

Check 3662 opposite last page.

Squeeze-action-type valves have no poppets, spools, or metal-to-metal contacts. They are specified in Bul 91043—Airmatic Valve Incorporated.

Check 3663 opposite last page.

Ball valve design incorporates top entry, in-line maintenance, top- and bottom-guided ball, and double seats. Specifications on complete line are incorporated in Ball Valves Bul—Hydromatics, Inc.

Check 3664 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Valved couplings are produced in sizes of ¼ to 6" in aluminum, brass, steel, and 303 and 316 stainless steel. Additional information is contained in Cat 58—Snap-Tite.

Check 3665 opposite last page.

Resilient-seated butterfly valves incorporate resilient elastomer liner to form positive seal with disc. Full information is included in Bul 590X—W. S. Rockwell Company.

Check 3666 opposite last page.

Jacketed spring-loaded plug valves are available in wrench- or air-cylinder-operated types. They are topic of Bul J-57—Hetherington & Berner Inc., Subsidiary of American Hoist & Derrick Company.

Check 3667 opposite last page.

Pumps

Pumps for moving viscous liquids at 10 to 300 gpm and for other pumping applications in ½- to 1050-gpm range are considered in Cats CCC and MCC—Viking Pump Company.

Check 3668 opposite last page.

Portable rotary pumps are available in gear and screw models to handle materials of volumes from 1 to 2600 gpm and viscosities from 32 to 5 million SSU, and pressures to 1000 psig. Other information on line is included in Portable Rotary Pumps Bul—Sier-Bath Gear & Pump Co., Incorporated.

Check 3669 opposite last page.

Vertical pumps for handling molten chemicals are discussed in Bul V-837—Taber Pump Co.

Check 3670 opposite last page.

Slurry pumps for handling abrasives are available in 11 models in 1, 1½, 2, 3 and 4" sizes. There are three bearing frames for all 11 models. Pumps are considered in bulletin put out by Morris Machine Works.

Check 3671 opposite last page.

Fluids Handling

Ductile-iron pipe fittings have yield strength of 45,000 psi. They are covered in bulletin published by The Kuhns Brothers Company.

Check 3672 opposite last page.

Pump cups are available in designs including conventional and 45°-bevel types in full range of sizes reciprocating-pump and cylinder requirements. They are explained in Bul 5903—Darling Valve & Manufacturing Co.

Check 3673 opposite last page.

Spray-nozzle line, in which a size and spray pattern is available for every purpose, is tabulated in Spray Nozzle Cat—Binks Manufacturing Company.

Check 3674 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Gaskets, of ring, corrugated-metal and heat-exchanger types, are considered in Buls 563, 565 and 564, respectively—Chicago-Wilcox Mfg. Co.

Check 3675 opposite last page.

Jacketed pipe and fittings are hydrostatically tested to 450 psi. Additional specifications are tabulated in Bul J-57—Hetherington & Berner Inc., Subsidiary of American Hoist & Derrick Company.

Check 3676 opposite last page.

Spray-drying nozzles have tungsten-carbide orifices. They are depicted in Cats SD-1 and SD-2—Delavan Manufacturing Company.

Check 3677 opposite last page.

Spray nozzles' performance are reviewed in series of profiles complete with data on materials, dimensions, flow rates, pressures, and angles of spray Spray Nozzle "Profiles"—Spray Engineering Company.

Check 3678 opposite last page.

USED TO THINK EVERY STEAM TRAP LEAKED STEAM.
THEN I FOUND ONE THAT DIDN'T, BUT IT WOULDN'T VENT AIR.
FOUND ONE THAT VENTED AIR, BUT IT NEEDED A COOLING LEG.
DISCOVERED A TRAP THAT REMOVED CONDENSATE AT STEAM TEMP, -MAINTENANCE WAS TOO HIGH.
THEN I FOUND A LOW MAINTENANCE TRAP. IT DIDN'T WORK AGAINST BACK PRESSURE.
AT LAST I FOUND ONE THAT WORKED AGAINST BACK PRESSURE, BUT IT'S CAPACITY RATING WASN'T DEPENDABLE.
ARMSTRONG PROMISES TRUE CAPACITIES AND EVERYTHING ELSE. SO I CALLED THEM. THEY TOLD ME TO RELAX. I COULDN'T.
THEY TOLD ME ABOUT ARMSTRONG'S GUARANTEE. WHAT'S I HAVE TO LOSE. I TRIED THEM.
EFFICIENCY IS UP, FUEL BILLS ARE DOWN, SO ARE MAINTENANCE COSTS. MAN I'M LIVING!

No one trap can do *everything* better than every other trap. Some traps vent air better than others, some remove condensate faster, etc. But, there is no one trap *best* in every phase of trapping. Armstrong has been manufacturing the Inverted Bucket Trap for nearly fifty years, and though the traps have changed with the requirements of the times, the Inverted Bucket principle has remained. For on overall trap performance, year-in and year-out, nothing beats the Armstrong Inverted Bucket Trap. It's a rugged well-built trap that does *more* things better than any other trap. It's guaranteed because it's been proved.

For more details, see your Armstrong Representative and start living . . .

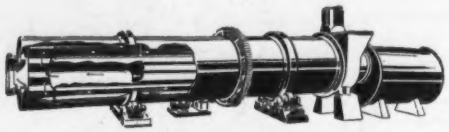
P. S. Like some good meaty reading? Ask for the 48-page Armstrong Steam Trap Book.

ARMSTRONG MACHINE WORKS
8807 MAPLE STREET
THREE RIVERS, MICHIGAN
See our Catalog in Chemical Engineering Catalog 011-ST

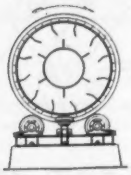
Check 3679 opposite last page.

Ruggles-Coles®

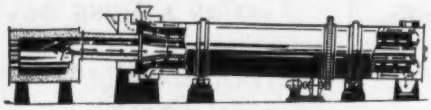
ROTARY DRYERS, HEATERS AND COOLERS



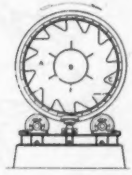
Semi-Direct Heat, Double-Shell Dryer, ideal for coal drying.



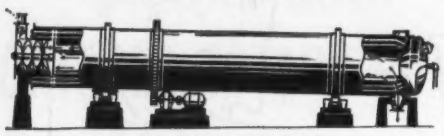
Cross section of Semi-Direct Heat, Double-Shell Dryer showing lifting flights on inner and outer shells.



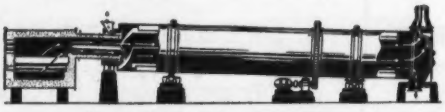
Indirect-Heat, Double Shell Dryer for kaolin, chalk, china clay, etc.



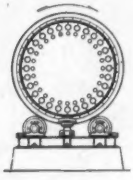
Cross section of Indirect Heat Dryer. "A" is the completely isolated space in which the material is dried. "B" is the inner hot gas passage. "C" represents the V-ducts for the gas return.



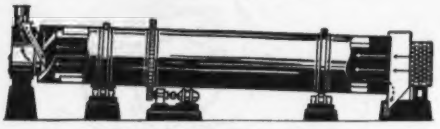
Rotary Steam-tube Dryer designed for raw chemicals.



Single-Shell, Direct-Heat Dryer Parallel or Counter-Flow for sticky organic or inorganic materials.



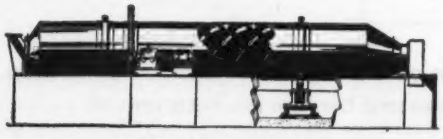
Cross section view of Steam Tube Dryer.



Hot-Air Dryer for drying inorganic salts and similar materials.

Rotary Kiln for continuous calcining, roasting or oxidizing.

Cross section of Single-Shell, Direct Heat Dryer.



Rotary Cooler for continuous cooling of hot materials after drying or calcining.

WRITE FOR CATALOG 16-E-13

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"Hardinge Equipment—Built Better to Last Longer."

NEW YORK
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HIBBING
SALT LAKE CITY
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HOUSTON
LAKELAND
BIRMINGHAM

Check 3680 opposite last page.

CURRENT LITERATURE

Steam traps are available in ⅜ or ½" size for pressures of 8 to 600 psi. Additional data is covered in Bul T-1743-B—Yarnall-Waring Company.

Check 3681 opposite last page.

Ball joints provide flexibility in pipe movement to 40° side and 360° rotational. They are outlined in Bul 2153—Barco Mfg. Company.

Check 3682 opposite last page.

Pipe Fabrication Institute's standards are available in a publication.

Check 3683 opposite last page.

Steam traps each incorporate inverted-bucket principle. Additional details are included in 48-page Steam Trap Book—Armstrong Machine Works.

Check 3684 opposite last page.

Rubber pipe is made to withstand pressures to 50 psi. Complete line is detailed in Bul 7152—Manhattan Rubber Division, Raybestos-Manhattan, Inc.

Check 3685 opposite last page.

Tube fittings are available in sizes for 1/16 to 1" OD tube. They are explained in Swagelok Tube Fittings Bul—Crawford Fitting Company.

Check 3686 opposite last page.

Fluid-transfer equipment is subject of 14-page bulletin covering complete line. Fluid Transfer Bul—Gray Company, Inc.

Check 3687 opposite last page.

Forged-steel fittings and flanges are indexed in Cat S-10—Henry Vogt Machine Co.

Check 3688 opposite last page.

Spray-nozzles data are reviewed in series of sheets available from Spraying Systems Co.

Check 3689 opposite last page.

Safety

Breathing equipment for a variety of hazardous situations is considered in bulletin put out by Scott Aviation Corporation.

Check 3690 opposite last page.

Safety and oily waste cans are subject of bulletin available from the Justrite Manufacturing Company.

Check 3691 opposite last page.

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CORROSION
the modern
way . . .

with new

Aerovent

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DUCT FANS

Featuring a unique built-in orifice and tear-drop shaped belt housing, Aerovent *Fiber Glass* Duct Fans are designed for your "*problem*" ventilating requirements. Virtually unaffected by normal concentrations of corrosion and most forms of chemical attack, *fiber glass* – used in the construction of the fan housing and other internal surfaces–assures longer, more dependable service in even the most difficult applications.

Propellers are stainless steel or Dura–a special alloy created by Aerovent for better resistance to corrosive atmospheres. Available in 17 models in sizes 14" to 42" for capacities to 32,500 cfm.

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FAN COMPANY, INC.
Ash and Burr Streets Piqua, Ohio

Check 3692 opposite last page.

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INDUSTRIAL SPRAY NOZZLES

NEW FREE CATALOG . . .
32 illustrated pages of engineering data, including nozzle spray characteristics, capacities, applications and simplified nozzle selection tables.

MORE NEW INFORMATION . . .
BULLETINS: Square spray and solid jet patterns.
DATA SHEETS: Leak-proof adjustable joint, phosphatizing nozzle and roof cooling.
COMPARISON CHARTS: Shows nozzle interchangeability.

Write today . . . take advantage of Steinen's complete engineering service.

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INDUSTRIAL NOZZLE DIVISION
45-47 Bruen Street Newark, New Jersey

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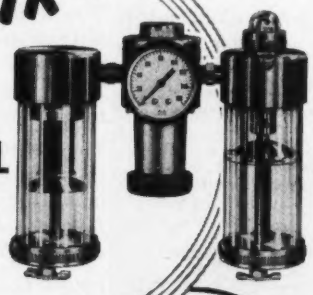
AIR CONTROL UNITS



Write for Bulletin LA-20M Dept. CP-461 Bellows-Valvair Akron 9, Ohio

Automatically filter pressurized air to assure a clean, dry air supply . . . automatically compensate for fluctuations in air pressure . . . automatically compensate for variations in cfm requirements . . . automatically adjust amount of misted lubricant to meet changing cycle rates. ¼" through 1" sizes.

997-C

Bellows-Valvair
AKRON 9, OHIO
DIVISION OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)

Check 3694 opposite last page.

CURRENT LITERATURE

Flame arresters which are vertically mounted rectangular-plate type for outside housings incorporate pressure-tight aluminum-alloy casting. These are reviewed in Protectoseal Blue Book—The Protectoseal Company.

Check 3695 opposite last page.

Explosion-proof electrical equipment including fittings, lighting, panel board and other items is topic of bulletin put out by Appleton Electric Company.

Check 3696 opposite last page.

Supplying fresh air or discharging foul is job of ventilator-blowers which are reviewed in bulletin published by Coppus Engineering Corporation.

Check 3697 opposite last page.

Packaging

Bag packer is fully automatic, all-mechanical and requires no outside motivation such as electricity or compressed air. Unit is specified in Rotomatic Bag Packer Bul—Raymond Bag Corporation.

Check 3698 opposite last page.

Containers for gases, liquids and solids are subject of Containers Bul—Pressed Steel Tank Company.

Check 3699 opposite last page.

Cutting valve-bag packing costs is subject of six-page brochure, including six drawings illustrating practical applications for automatic bag packer. Bag-packing Costs Bul—E. D. Coddington Manufacturing Company.

Check 3700 opposite last page.

Material Handling

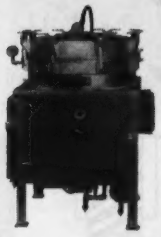
Tractor-shovels, including models in 2500-lb operating-capacity class with complete power-shift transmission (two forward and two reverse speeds) are subject of bulletin, "Industrial Material Handling from A to Z"—The Frank G. Hough Co., Subsidiary of International Harvester Company.

Check 3701 opposite last page.

Dumpers, for lifting and dumping drums, bags, skid boxes, boxes, barrels and trucks, are taken up in six-page Dumper Bul—Conveyors & Dumpers, Inc., Division of Mercury Industries, Inc.

Check 3702 opposite last page.

YOU GET *Lower* VACUUM PUMP MAINTENANCE *Costs* and INCREASED VACUUM with the HILCO OIL RECLAIMER



HILCO OIL RECLAIMER
For complete oil reclaiming. Removes solids, acids and volatile impurities; moisture, solvents, gases, etc. by heat-vacuum process.

A simple, economical and efficient method of restoring contaminated lubricating and sealing oil to the full value of NEW OIL. The HILCO will produce and maintain oil free of solids, water, gums and acids in a continuous, all-electric, automatic operation.

★ *Be Sure of CLEAN OIL in Your High Vacuum Pumps*

KEEP YOUR HYDRAULIC SYSTEM *Clean* with HILCO HYDRAULIC OIL FILTERS

- **No More Varnish and Sludge Deposits**
- **No More Flushing and Manual Cleaning**
- **No More Frequent Oil Changes**
- **No More Accumulation of Dirt**

Filter life up to a year eliminates usual frequent draining, refilling of systems.

★ *Write for complete details in the free bulletin at no obligation . . .*

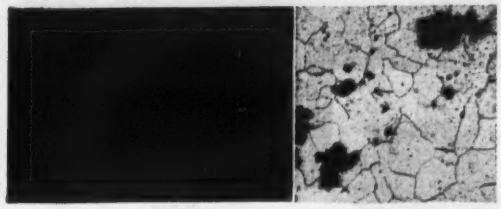
The HILLIARD Corporation
58 WEST FOURTH ST., ELMIRA, N. Y.

In Canada:
UPTON-BRADEEN-JAMES LTD.

Check 3703 opposite last page.

3-LOBE DESIGN

Exclusive M-D 3-lobe design adds strength—reduces torsion. Dynamically balanced rotor permits higher speeds —greater pressures.

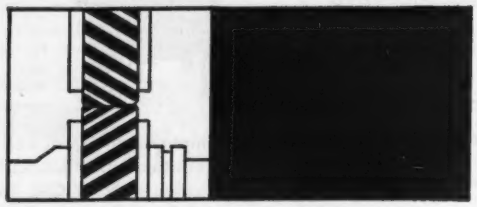


DUCTILE IRON

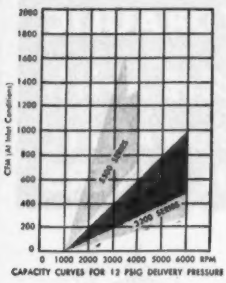
Only M-D uses ductile iron rotors. Only M-D rotors are cast with lobe and shaft integral—no pins to work loose. Makes M-D blowers safest at high speeds.

HELICAL GEARS

Every M-D blower shipped has a matched pair of crown-shaved, helical gears. Backlash tolerance is .0005" to .0015". No other blower matches M-D quality.

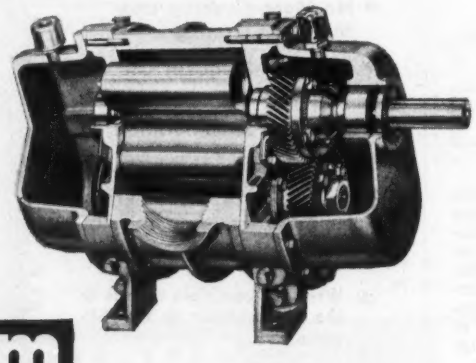


WHY M-D ROTARY POSITIVE BLOWERS DEVELOP HIGHER PRESSURES...



The unique combination of precision manufacture and modern design found only in M-D rotary positive blowers permits higher speed operation and higher pressures. For this reason M-D can furnish greater air flow at lower initial cost.

M-D blowers operate at wider pressure and speed ranges than any other rotary positive blower. Capacities of 30 production models range from 30 to 4,000 CFM, pressures to 15 PSIG single, 70 PSIG multi-stage.



For full information write

M-D BLOWERS, INC., RACINE, WISCONSIN

A SUBSIDIARY OF MIEHLE-GOSS-DEXTER, INC.

Check 3704 opposite last page.

CURRENT LITERATURE

Fork-lift trucks are subject of 16-page bulletin including detailed engine specifications. Bul BU-660—Engine-Material Handling Division, Allis-Chalmers.

Check 3705 opposite last page.

Weight-sensing applications, for control of basic operative functions in automated machines, processing equipment and quality-control operations, is subject of manual, "Weight Sensing"—The Exact Weight Scale Co.

Check 3706 opposite last page.

Openers for bales of excelsior, asbestos, rags, natural and synthetic fibers, and similar products can handle to 1000 lb./min. They are further detailed in Bul 400—Taylor, Stiles & Company.

Check 3707 opposite last page.

Fork-lift trucks are available with pivot-action steering axles in series with load capacities to 24,000 lb. Line is reviewed in Fork-lift Trucks Bul—Towmotor Corp.

Check 3708 opposite last page.

Gas-powered lift-truck information is contained in "Facts and Factors About Gas-powered Lift Trucks" and "Automatic Industrial Lift Trucks Selector Guide" —Automatic Transportation Company, Division of The Yale & Towne Manufacturing Company.

Check 3709 opposite last page.

Weighing is taken up in Bul 2036 —Toledo Scale, Division of Toledo Scale Corporation.

Check 3710 opposite last page.

Bulk-handling controls, are covered in bulletin put out by Electronic Controls Division, Flo-Tronics, Inc.

Check 3711 opposite last page.

Electrical-permanent-magnetic bin vibrators operate on direct AC. Technical data is available in Hi-Vi Vibrators Bul—Eriez Manufacturing Company.

Check 3712 opposite last page.

Bulk-handling railroad car, incorporating pneumatic unloading nozzle is subject of Dry-Flo Chem Car Bul—Airslide and Dry-Flo Car Division, General American Transportation Corporation.

Check 3713 opposite last page.

For more information on developments in the section, check the Reader Service Slip.

DON'T GIVE UP on moisture problems

When you're in over your head with water contamination worries, you can count on CEC's 26-310 Process Moisture Monitor to pull you out.

The 26-310 detects moisture down to one part per million...assures laboratory instrument accuracy for plant monitoring of gaseous streams. *Bulletin CEC 1845-X2.*

CEC's family of moisture monitors is made up of six precision instruments for industrial and military use, including two portable units for laboratory and field applications. *Bulletin CEC 1834-X14.*

For full information, write for bulletins or call your nearest CEC sales and service office.

Analytical & Control Division

CEC

CONSOLIDATED ELECTRODYNAMICS

pasadena, california

a subsidiary of Bell & Howell

Check 3714 opposite last page.

CURRENT LITERATURE

Motors and Drives

Shaft-mounted speed reducers are available in capacities to 170 hp; output speeds of 10 to 400 rpm; ratios of 5:1, 15:1, 25:1; and speed ratios to 175:1. They are covered in Torque-Arm Bul—Dodge Manufacturing Corporation.

Check 3715 opposite last page.

Gear drives and flexible-shaft couplings are depicted in four-page Bul 20,000—The Falk Corporation.

Check 3716 opposite last page.

Shaft- and flange-mounted drives are considered in 36-page bulletin including information on dimensions, applications and accessories. Bul 7100—The Falk Corporation.

Check 3717 opposite last page.

Variable-speed drives, which incorporate all-metal, self-tooth-forming chains, are available in 8 sizes and 16 standard types, in capacities of ½ to 25 hp. Book 2274 contains complete story—Link-Belt Company.

Check 3718 opposite last page.

Variable-speed drives are presented in 16-page bulletin including a page giving drawings and explanations for installations. Cat ZM-400C760—The Zero-Max Co.

Check 3719 opposite last page.

Mixing and Blending

Mixers for handling both dry and semi-wet chemical powders, among other things, are specified in Mixers Bul—Rapids Machinery Co.

Check 3720 opposite last page.

Continuous mixers, each have dual impellers and stationary stators to create turbulence and shearing action. Specifics are tabulated in Bul RL-200—Gabb Special Products Inc.

Check 3721 opposite last page.

Blender with internal agitator handles lumpy, caked, balled and fibrous materials. It is among units covered in 12-page Brochure C—Paul O. Abbe, Inc.

Check 3722 opposite last page.

Mulling is topic of handbook available from Simpson Mix-Muller Div., National Engineering Co.

Check 3723 opposite last page.

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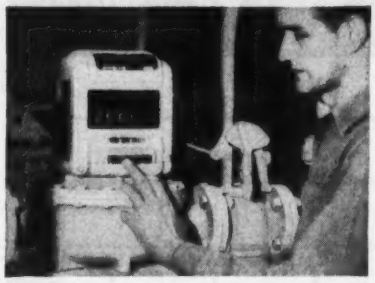
Measurement/Control News

prepared by Neptune Meter Company

How St. Regis Gets Closer Control Over Clay & Starch Mixes



DEFERIET, N.Y.—In preparing both clay and starch mixes, the St. Regis fine paper mill here controls solution strength with automatic meters. In clay, meters are used at *three* stages: Adding water to dry clay to make 55% slurry; cutting slurry to 15%; and proportioning slurry and water at the beater to dilute to 2%.

In starch, meters measure water into cooker for 20% mix, then measure both hot starch and water for accurate dilution to 8%. Meters are Neptune Auto-Stop, 1 to 2 inches.

What works on starch and clay can also work for you. Write today.

Meter with a memory... Never forgets your formula

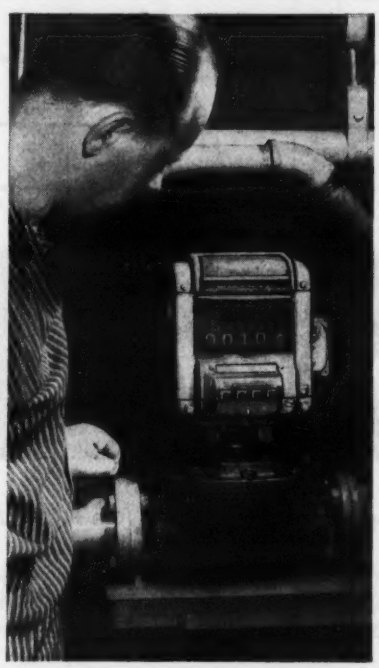
For liquid batching where formula repeats, this automatic meter has precise mechanical memory. Set quantity just once, open valve, and meter takes over. Shuts off at correct quantity batch after batch. Can even print tickets. Easy to reset for new formula. Ask for facts on Repeating Auto-Stop.

HOW TO STOP DRIP OF VISCOUS LIQUIDS. When metering viscous liquids, don't try to drain the line between meter and vat after each delivery. It'll drip forever, and you usually don't want air contact anyway. Instead, put an inexpensive spring-loaded Anti-Drip valve on the end of the pipe. Ask Neptune.

West Chemical Improves Accuracy With Stainless Steel Batching Meters

Operator merely pushes buttons; Auto-Switch shuts off pump at exact quantity

LONG ISLAND CITY—For safety, speed and accuracy, West Chemical Products, Inc., reports excellent results after replacing gauge-stick measurement with stainless steel liquid meters in formulating CN-Plus, Westpine, Tamed Iodine and other West sanitation products.



"Big savings are time and materials," says Rudolph Londner, plant superintendent. It took time to stop the agitators, wait for liquids to stop swirling, open the lids, and read the gauge sticks. And when batching errors showed up in the quality control lab, *more* time was wasted making adjustments and retesting.

Now accuracy is controlled by push-button. A row of buttons on each meter sets the quantity. A switch starts the pump. The meter keeps count and stops the pump *automatically* at the anticipated quantity.

Plouronics-Iodine Complexes

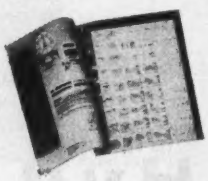
For ingredients such as plouronics-iodine complexes, West uses Neptune stainless steel Auto-Switch meters, which have only two moving elements in contact with liquid. For non-corrosive liquids, bronze Auto-Switch meters are used.

By assuring closer control, meters help comply with labeling regulations, and assist in obtaining government contracts. West also uses Neptune meters in ion-exchange and chlorination processes, and in the manufacture of waxes and soaps.

How can you benefit from West Chemical's experience? Neptune field engineers will be happy to offer helpful suggestions. Phone or write today.

HELPFUL METERING DATA AVAILABLE

28-pg. technical bulletin lists liquids, helps pick proper sizes and features of meters 2 to 2000 gpm.



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Check 3724 opposite last page.

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Check these features!

	FLO • BALL	VALVE A	VALVE B	VALVE C	VALVE D	VALVE E
1. TOP ENTRY	√			√		
2. IN-LINE MAINTENANCE	√			√	√	
3. TOP AND BOTTOM GUIDED BALL	√					
4. DOUBLE SEATS	√	√	√	√	√	√
5. FLANGES INTEGRAL WITH BODY	√	√		√		
6. ONE-PIECE BALL AND STEM	√					
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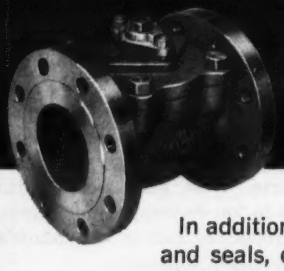

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FLO-BALL

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Check 3725 opposite last page.

Conveying

Tubular conveyors which are self-cleaning and self-supporting are covered in Fact-finding Report—Conveyor Division, Hapman Corporation.

Check 3726 opposite last page.

Vibrators, and vibrating conveyors and tables are presented in publication of The Cleveland Vibrator Company.

Check 3727 opposite last page.

Vibrating conveyors can handle material flows as high as 90 fpm. They are detailed in Bul 361—Engineering Division, Stephens-Adamson Mfg. Co.

Check 3728 opposite last page.

Bulk-materials-conveying applications ideas are considered in Lo-Veyors Selection Guide—Ajax Flexible Coupling Co. Inc.

Check 3729 opposite last page.

Vibrating equipment is reviewed in bulletin from Carrier Division, Chain Belt Company.

Check 3730 opposite last page.

Vibrating conveyors are available in variety of lengths and widths. They are specified in Vibrating Conveyors Cat—Syntron Co.

Check 3731 opposite last page.

Lubrication

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Check 3732 opposite last page.

Lubricators start, stop, speed-up or slow-down in synchronization with equipment being handled. Explanation of line is contained in Lubricators Cat—Manzel, Unit of Houdaille Industries, Inc.

Check 3733 opposite last page.

Oil reclaimers are designed to remove solids, acids and volatile impurities . . . along with moisture, solvents and gases . . . by heat-vacuum process. Units are delineated in Oil Reclaimers Bul—The Hilliard Corporation.

Check 3734 opposite last page.

Centralized lubrication system is explained, pictured and specified in 16-page Form 34-18—Alemite, Division of Stewart Warner Corp.

Check 3735 opposite last page.

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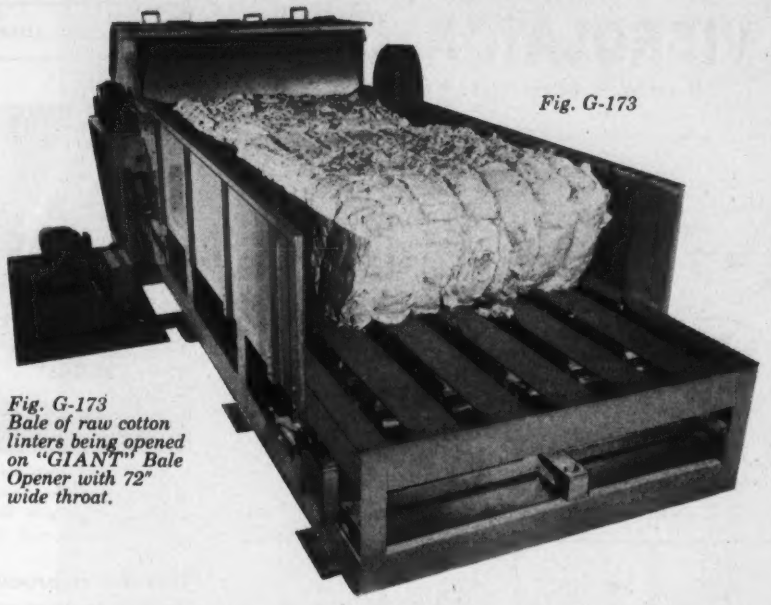

Fig. G-173

Fig. G-173
Bale of raw cotton linters being opened on "GIANT" Bale Opener with 72" wide throat.

SAVE TIME, MONEY AND MANPOWER WITH TAYLOR-STILES

BALE OPENERS

Used for opening bales of raw or processed cotton linters, excelsior, asbestos, jute, cork, straw, bagasse, tobacco, rags and natural and synthetic baled fibers.

Opening hard, compacted bales for processing has in the past been a time consuming, laborious, back-breaking job for from one to four men per bale, usually using sledge hammers or axes. The Taylor-Stiles line of Bale Opening Machines was developed to provide a semi-automatic process that not only increases the number of bales processed per hour but also reduces the manpower to one or two men.

Because the opening of bales of natural or synthetic fibrous materials is a preparatory operation for many industrial processes, Taylor-Stiles engineers have designed a number of varieties of bale openers. All of them basically operate on the same principles but differ in ways that best suit them to the individual installations for which they are intended. The type and condition of the material being opened, the structure of the bale, the bale size, and the hourly capacity required all have to be taken into consideration in selecting the proper machine.

Taylor-Stiles Bale Openers can handle up to 1000 lbs. per minute of the most densely compacted material. They are safe since no human hand touches the bales after they are placed onto the feed deck. They eliminate heavy labor, needless handling of bales, and shovelling of loose materials. "GIANT" Bale Openers are ruggedly constructed of heavy welded steel plate and are reinforced to withstand continuous, year-after-year use.

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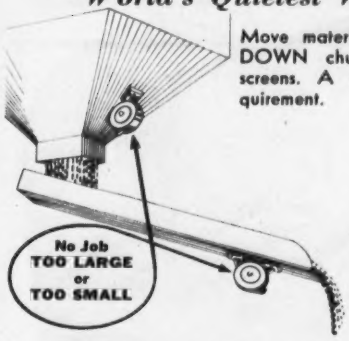

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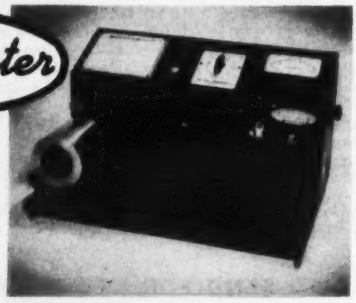

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that's interesting

Power from two flashlight batteries causes tiny device to freeze water — or with flip of switch to melt it

Tiny device produces heat or cold on demand

A device, smaller than a paper clip, heats or cools at the flip of a switch. In clusters, its potential uses vary from maintaining room temperature in a space ship to operating an instant-defrosting refrigerator with no moving parts.

It uses a principle of thermoelectric cooling, made practical by development of new technique for fabricating thermoelectric material which makes it possible to operate on 1/10 of current previously needed.

Heat is produced at junction of two special semiconductor materials when a current is passed through it. Reversal of direction of current flow causes device to cool. Heating efficiency is up to eight times as high as conventional resistance heaters such as electric toasters or stove elements.

Hughes Aircraft Company, developer of the device, has built a three-stage "cascaded" cooler that brings temperature down to −100°F and is used to cool an experimental infrared detector. The device requires only two amp.

Teflon-coated frying pan cooks without fat

Frying without fat is possible with an intriguing frying pan currently being introduced in this country from France. This intriguing quality is made pos-

FLUID & GAS PRESSURE TANKS

STAINLESS & CARBON STEEL TANKS

(GOVERNMENT SURPLUS BARGAINS)

Steel tanks for the handling, storage and transportation of gases, beverages, fuels, hydraulic fluids and other liquids. Stainless steel tanks for corrosive acids and gases.

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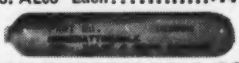
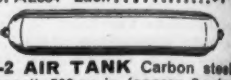
G-1 TANK Stainless steel. Capacity 2100 cu. in. (9 gals.) 450 P.S.I. ¼" pipe thread port at each end. 24" long, 12" dia. Shipping weight 19 lbs. F.O.B. Chicago. (Two for $27.00.)
No. AE63 Each.....$14.95

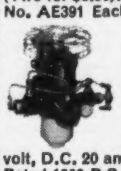


NON-SHATTERABLE CO_2 CYLINDER This type of pressure bottle was used by the Armed Forces for inflating life rafts. 18¼" long, 3¾" dia. Has ½" pipe thread opening at one end. Capacity 2.98 lbs. of CO_2—at 1800 P.S.I. Shipping weight 10 lbs. F.O.B. Chicago.
No. AE303.....$2.50

FREON TANK Capacity 22 oz. of Freon F22, 6 cc Methyl Alcohol, 18¼" long, 2" dia. ¾" pipe thread opening at one end. Equipped with brass valve. Shipping weight 3 lbs. F.O.B. Chicago. (Six for $8.00).
No. AE834 Each.....$1.50



D-2 AIR TANK Carbon steel. Capacity 500 cu. in. (approx. 2 gals.) 450 P.S.I. ½" pipe thread port at each end. 24" long, 6" dia. Postpaid. (Two for $8.50).
No. AE391 Each.....$4.50



CORNELIUS HIGH PRESSURE (1500-2000 P.S.I.) AIR COMPRESSOR Three cylinder, 3-stage compressor, complete with 27 volt, D.C. 20 amp. motor, with fan. Rated 1500 P.S.I. continuous duty, 2000 P.S.I. intermittent. Pressure switch in base. As released by Air Force, in used, serviceable condition. Covered by our 30 day GUARANTEE. 11½" long, 7" high, 9" wide. Shipping weight 12 lbs. F.O.B. Chicago. Limited quantity.
No. AE549.....$35.00

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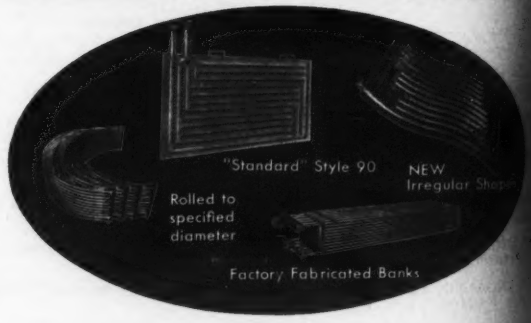

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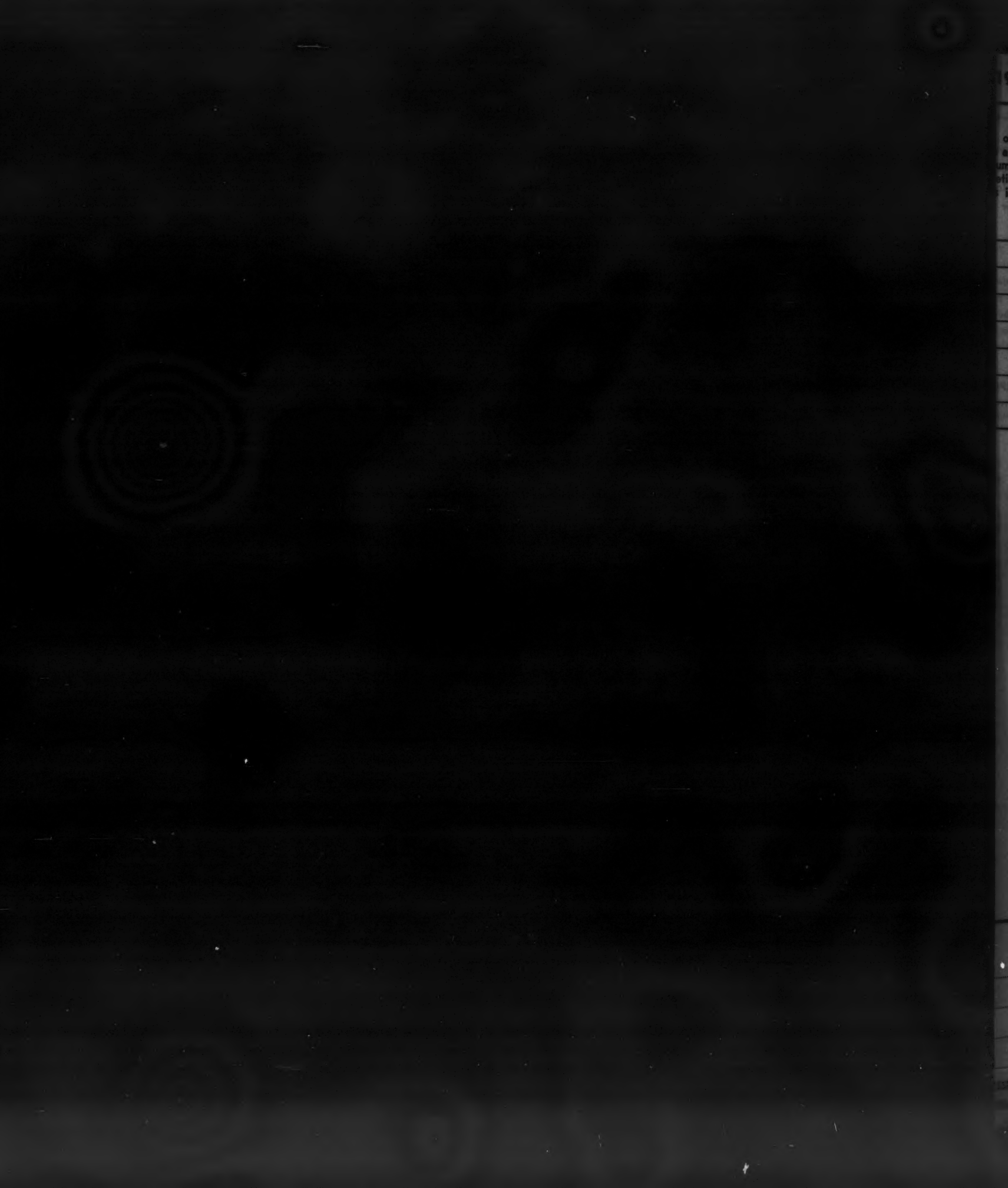


sible by the fact that the inside surface is coated with a Du Pont non-sticking Teflon resin.

Except for the light grey, somewhat stripey-looking finish of the inside surface, the pan resembles conventional models. It is fabricated of aluminum.

Since the coating prevents sticking, cleaning the pan is simply a matter of swishing it out with dish cloth and warm soapy water. Some precautions are in order — only wooden and rubber utensils should be used in the pan; nothing should be cut up in it; and only moderate heat should be used with it.

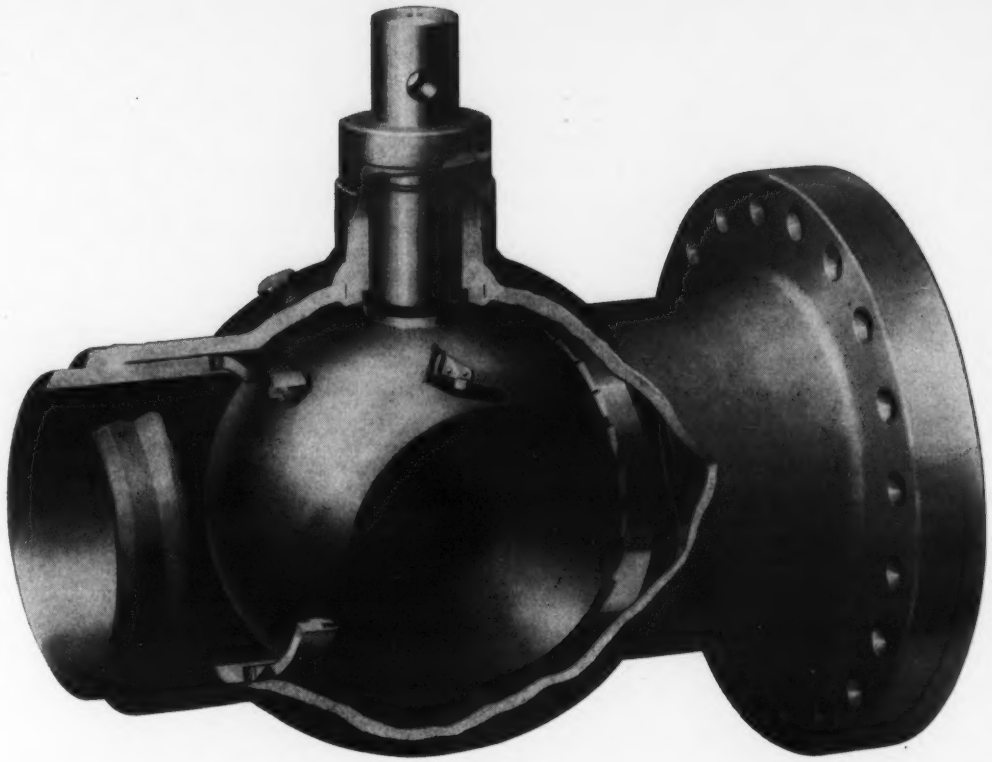
Chair has all-foam body molded around steel frame

Springless chair features molded all-foam body

There are just two basic parts — tubular steel frame and molded polyether foam body — to a chair currently being intoduced with 1961 furniture lines. The chair has neither interior springs, nor box-work to hold seating in place.

Karpen Division, Schnadig Corp., designs chair and fashions steel outline, then ships it to General Tire & Rubber Co. There, quick-mixed chemicals for the polyether foam body are "blown" into a mold surrounding frame.

Chair is returned to Karpen for covering with fabric and addition of special "throw pillow" before being marketed. Foam's polyol, catalyst and blowing agent are furnished by Union Carbide Chemicals Company.



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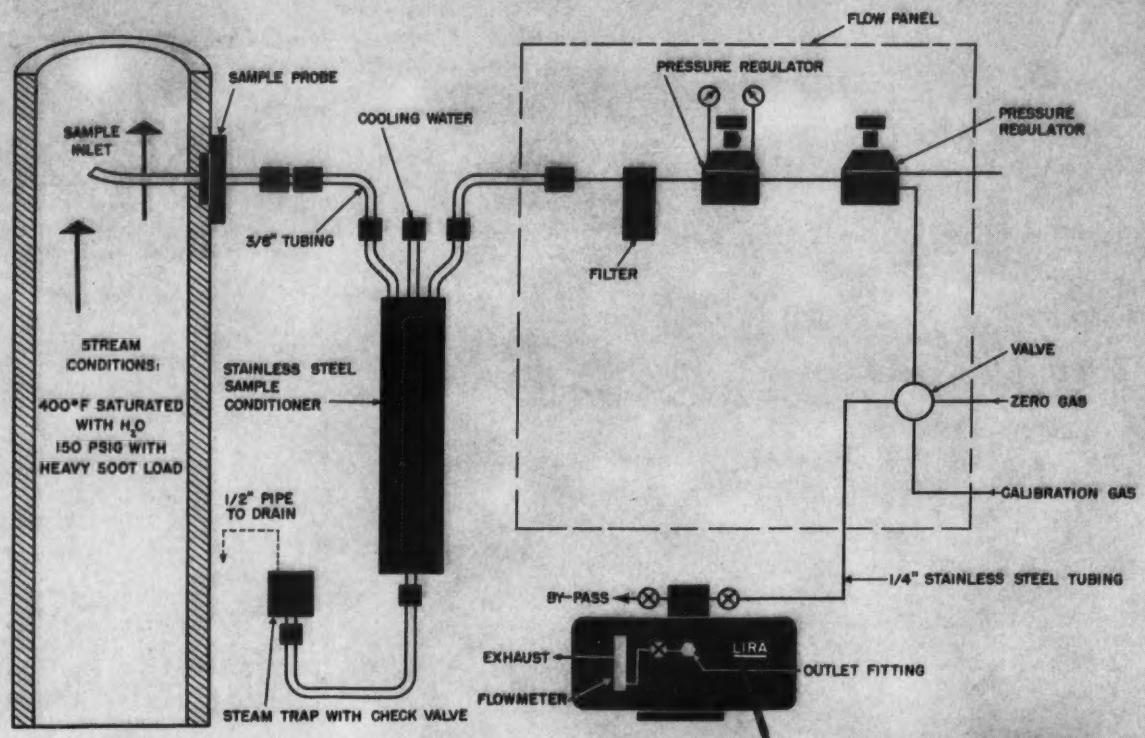

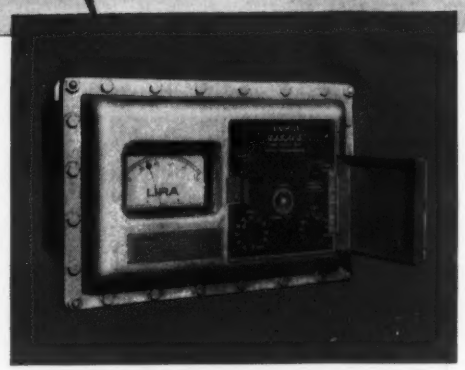

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Speaking now of applications, one of the really tough problems is analyzing the methane in the process gas immediately after the reformers. The gas stream is dirty. It is saturated with steam at high temperature and pressure. But the methane has to be measured to determine the reaction efficiency. This measurement enables the operator to adjust the process when reactor temperature or changes in the raw feed stock cause variations in methane content.

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